DOE EA-0625

FINAL

SUBSURFACE INTERIM MEASURES/ INTERIM REMEDIAL ACTION PLAN AND DECISION DOCUMENT FOR THE 903 PAD, MOUND, AND EAST TRENCHES AREAS (OPERABLE UNIT NO. 2)

PUBLIC COMMENT

RESPONSIVENESS SUMMARY

U.S. Department of Energy
Rocky Flats Plant
Golden, Colorado

10 SEPTEMBER 1992

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EXECUTIVE SUMMARY

The Department of Energy (DOE) is pursuing an Interim Measure/Interim Remedial Action (IM/IRA) at the 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2) at the Rocky Flats Plant (RFP). This IM/IRA is to be conducted to provide information that will aid in the selection and design of final remedial actions at OU2 that will address removal of suspected free-phase volatile organic compound (VOC) contamination. The Plan involves investigating the removal of residual free-phase VOCs by *in situ* vacuum-enhanced vapor extraction technology at 3 suspected VOC source areas within OU2. VOC-contaminated vapors extracted from the subsurface would be treated by granular activated carbon (GAC) adsorption and discharged. The Plan also includes water table depression, when applicable at the test sites, to investigate the performance of vapor extraction technology in the saturated zone. The Plan provides for treatment of any contaminated ground water recovered during the IM/IRA at existing RFP treatment facilities.

The proposed IM/IRA Plan is presented in the document entitled "Proposed Subsurface Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document, 903 Pad, Mound, and East Trenches Areas, Operable Unit No. 2," dated 20 March 1992. Information concerning the proposed Subsurface IM/IRA was presented during a DOE Quarterly Review meeting held on 07 April 1992 and a public meeting held on 07 May 1992, at the Marriott Hotel in Golden, Colorado.

The Responsiveness Summary presents DOE's response to all comments received at the public meeting, as well as those mailed to date to DOE during the public comment period. The public comment period was originally scheduled to conclude on 20 May 1992. However, the end of the comment period was extended to 09 July 1992 to allow the public some time to review the Subsurface IM/IRAP/EA along with the Administrative Record for OU2. The OU2 Administrative Record was made available to the public on 09 June 1992.

There were a number of regulatory and technical comments on the Subsurface IM/IRA Plan that DOE has addressed herein. Of particular note are the applicable or relevant and appropriate regulations (ARARs) presented in the Plan that pertain to the treatment of any contaminated ground water that may be generated from IM/IRA dewatering operations. The comments express disagreement with the approach used by DOE to develop the ARARs. A common approach to developing ARARs for remedial actions conducted at RFP is the subject of separate discussions between DOE and regulatory agencies. The ARAR discussions are expected to conclude by early 1993. It is important to note, however, that the proposed Subsurface IM/IRA at OU2 is independent of the ARAR discussions because of the planned use of existing RFP water treatment facilities. Specifically, the effluent limitations already established and approved for these units will apply to cleanup of contaminated ground water processed by them. Implementation of the Subsurface IM/IRA should, thus, not be affected by the site-wide ARAR development strategy discussions.

Construction of additional interceptor canals as commented upon by the cities of Westminster and Broomfield are also the subject of separate negotiations between DOE and the cities; these negotiations are not being reported on in this document. Whether or not the canal is in place prior to IM/IRA implementation, the DOE is fully committed to execution of the project in a

safe and reliable manner. Treatment system performance verification and the Subsurface IM/IRA are being carefully planned in conjunction with EPA and CDH to ensure an effective and safe action. This includes performance verification of the units used to treat ground water, and that all necessary environmental monitoring and controls accompany the action.

There are several additional topics where multiple comments were received by the public. These include the following:

- Site background information
- Schedule
- Health and safety
- Vapor and ground water treatment
- Public involvement

Responses to these topical comments and others are included in this Responsiveness Summary.

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ACRONYM LIST

Am	Americium
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below ground surface
Cs	Cesium
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm/sec	centimeters per second
CWA	Clean Water Act
DCE	Dichloroethylene
DNAPL	dense nonaqueous phase liquids
DOE	U.S. Department of Energy
EIN	Environmental Information Network, Inc.
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GAC	Granular Activated Carbon
HEPA	High Efficiency Particulate Air
IAG	Inter-Agency Agreement
IHSS	Individual Hazardous Substance Site
IM/IRAP/EA	Interim Measures/Interim Remedial Action Plan/Environmental Assessment
LLNL	Lawrence Livermore National Laboratory
MCL	Maximum Contaminant Level
NCAR	National Center for Atmospheric Research
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
OSWER	Office of Solid Waste and Emergency Response
OU2	Operable Unit No. 2
PCE	Tetrachloroethylene
pCi/g	Picocuries per gram
PPCD	Plan for Prevention of Contaminant Dispersion
PPE	Personal Protection Equipment
PQL	Practical Quantitation Limit
PSHSP	Project-Specific Health and Safety Plan
Pu	Plutonium
PVC	polyvinyl chloride
QAPjP	Quality Assurance Project Plan
RI	Remedial Investigation
RCRA	Resource Conservation and Recovery Act
RFP	Rocky Flats Plant
ROD	Record of Decision
SDWA	Safe Drinking Water Act
TBC	To be considered
TRG	Technical Review Group
VOC	Volatile Organic Compound
WQCC	Water Quality Control Commission

SECTION 1

COMMUNITY INVOLVEMENT

The Rocky Flats Plant (RFP) has developed a Community Relations Plan to involve the public in the decision-making process as it relates to the environmental restoration activities. The plan meets the community relations requirements of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the U.S. Department of Energy/U.S. Environmental Protection Agency/Colorado Department of Health (DOE/EPA/CDH) Inter-Agency Agreement (IAG) for Environmental Management (EM) Program activities. Activities under the plan are also intended to meet requirements of the National Environmental Policy Act (NEPA).

While RCRA, CERCLA, and the IAG provide the basis for the Community Relations Plan, the plan has been tailored to the concerns and needs expressed by the community during a series of interviews with nearly 100 local citizens. The interview participants also suggested community relations activities that would help the public become better informed about environmental clean-up activities at the Plant and ensure citizen involvement early in the decision-making process.

For the Proposed Subsurface Interim Measures/Interim Remedial Action Plan/Environmental Assessment (IM/IRAP/EA) for the 903 Pad, Mound, and East Trenches Areas specifically, presentations were made at the 07 April 1992 DOE Quarterly Review Meeting and the 07 May 1992 public comment meeting at the Marriott Hotel in Golden, Colorado.

Citizens were notified of the availability of the document, the 60-day public comment period, the 50-day public comment period extension, and the aforementioned meetings through newspaper, radio, and direct mail announcements. A fact sheet describing the remediation area and the proposed plan was also mailed to approximately 1,500 individuals and organizations on the RFP mailing list.

Other ongoing public information efforts include the periodic Rocky Flats Environmental Restoration Update, an active speakers bureau for civic and educational organizations, and tour programs for groups and individual citizens. The DOE also holds Quarterly Review meetings discussing the status of environmental restoration activity in progress at the RFP, and publishes an annual RFP Site Environmental Report to provide information to the public about RFP environmental activities. The Community Relations Division also responds to numerous inquiries and requests for information about Plant activities throughout the year.

Four public reading rooms, which provide public access to Environmental Restoration documents, are maintained by DOE, EPA, CDH and the Rocky Flats Environmental Monitoring Council. The DOE Public Reading Room is located in the Front Range Community College Library in Westminster, Colorado.

SECTION 2

RESPONSES TO COMMENTS

RECEIVED DURING PUBLIC COMMENT PERIOD

DOE held a public meeting on 07 May 1992 to receive comments on the proposed Subsurface IM/IRAP/EA for the 903 Pad, Mound and East Trenches Areas (Operable Unit No. 2 [OU2]). These comments are presented in Section 2.1 in the order that they were received at the public meeting. Written comments were also provided by EPA, CDH, the cities of Westminster and Broomfield, and others, and are presented in Section 2.2.

The comments have been subdivided at points where the issue or subject changes, and the DOE response directly follows. The comments have been sequentially numbered to allow cross-referencing of responses. In addition, the following table has been prepared to provide an index of the comments by issue; each issue listed in the table is briefly summarized below to provide the reader with an overview of the public concerns with regard to the proposed Subsurface IM/IRA.

Issue	Comments Referring to Issue
Public Involvement	1, 4, 5, 8, 64, 71, 84, 85
Site Background Information	12, 13, 36, 37, 38, 41, 42, 47, 49, 52, 53, 55, 57, 58, 59, 65, 97
Development of Applicable or Relevant and Appropriate Requirements (ARARs)	3, 14, 21, 22, 23, 24, 25, 29, 31, 39, 43, 63, 72, 75
Schedule	11, 19, 20
Health and Safety	26, 46, 61, 82
Vapor and Ground-Water Extraction and Treatment	28, 32, 33, 45, 51, 62, 78, 79, 81, 87, 93, 94, 95

Public Involvement

Concern has been expressed with respect to public participation in the various stages of RFP remedial action planning and decision making. Specific concern was expressed with respect to the public's lack of involvement in the "No Action" decision concerning the collection and treatment of Woman Creek Basin seeps.

When the original surface water IM/IRA was defined, the Woman Creek seeps were targeted for collection simply because of the presence of solvents and above background plutonium concentrations in the water. A conceptual model of the fate of these contaminants and the corresponding risk to the public had not been formulated at that time. Assuming highly conservative public exposure scenarios (all the solvents are volatilized, transported to the property boundary, and are inhaled by a member of the public; direct consumption of Pond C-2 water assuming the present contamination arises entirely from the seeps), DOE quantified human health risks that indicate the seeps pose a low risk to the public. In accordance with EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30, the calculated risks are insufficient to trigger an IM/IRA. There are also no adverse environmental impacts resulting from the seeps. Further, seepage flow into the South Interceptor Ditch has never been observed, and seep flows are seasonal and were barely perceptible during the spring of 1991. Therefore, DOE concluded that no action was appropriate, and remediation of the seepage could await the final remedial action for OU2. These findings were presented to EPA and CDH. The regulatory agencies concurred with the risk findings but disagreed that no action was appropriate solely on the basis of low human health and environmental risks, i.e., the OSWER Directive also states that operation of an IM/IRA that provides information useful to the design of the final remedy is an important consideration for conducting an IM/IRA. It was therefore agreed amongst all parties that the subsurface IM/IRA be pursued as a more prudent use of the resources being applied to the investigation and remediation of OU2.

Although the rationale for pursuing the Subsurface IM/IRA in lieu of the Woman Creek Basin IM/IRA is sound, DOE recognizes its failure to inform the public or Technical Review Group (TRG) on this important issue. The draft Woman Creek Basin IM/IRAP/EA is available to the public via the public reading rooms. With respect to future planning for the Subsurface IM/IRA, the treatability study data and the project-specific Test Plans will be made available to the public and Technical Review Group. Public involvement in the Subsurface IM/IRA project has, thus far, included a presentation of the proposed Plan at a DOE Quarterly Review Meeting, the IM/IRA public meeting, and review and comment on the Subsurface IM/IRAP/EA.

Site Background Information

Several comments were received during the public comment period suggesting that more recent and complete site characterization data be incorporated into the Subsurface IM/IRAP/EA. The comments also suggest that additional site characterization information (e.g., soil vapor contaminant data) may prove useful in the design and implementation of the pilot tests.

The hydrogeologic, environmental, and contaminant data presented in the Subsurface IM/IRAP/EA provide general background information on OU2, and also provide the basis for IM/IRA planning. This background information will be updated and expanded in the final Subsurface IM/IRAP/EA, where appropriate. It is important to emphasize that successful design of the pilot tests will depend on site characterization data from near the proposed test sites (i.e., volatile organic compound [VOC] source areas). Much of this data is being collected at this time under the OU2 Phase II Remedial Investigation (RI). In the event that the Phase II RI data are not adequate to pinpoint plausible locations for the pilot test sites, a soil vapor survey will be conducted to collect additional information. Once the test sites are located, borings advanced

for installation of the extraction and monitoring wells will provide localized hydrogeologic information that will be used to design the wells and operate the vacuum extraction system.

Development of ARARs

In addition to the letter from CDH dated 12 March 1992, several comments were received during the public comment period concerning the development of ARARs for the proposed IM/IRA. Specifically, these comments addressed the overall DOE approach to determining ARARs and included specific suggestions to help improve and clarify the ARARs analysis in the Subsurface IM/IRAP/EA.

As discussed in Response to Comment 14, DOE is currently preparing a consolidated approach to determining ARARs pursuant to recent communications with CDH. The DOE is deferring its responses to comments received regarding its approach to determining ARARs until an agreed upon approach is established by the regulatory agencies and the DOE. The DOE believes this deferral should not interfere with the implementation of the IM/IRA because DOE has committed to adhering to the effluent limitations of the on-site water treatment facilities to which any extracted ground water will be sent as part of the pilot studies.

Schedule

The public has requested more information concerning the schedule for implementation of the Subsurface IM/IRA as well as updated information on the start-up of the RFP water treatment systems that may be used during the Subsurface IM/IRA.

A schedule of Subsurface IM/IRA activities that will occur after regulatory agency approval of the IM/IRAP/EA (03 September 1992) is provided in this Responsiveness Summary (Response to Comment 20); this schedule of activities will also be included in the final Subsurface IM/IRAP/EA. This Responsiveness Summary also provides updated information on the start-up dates for the South Walnut Creek Basin Surface Water Treatment System and the Building 231 Granular Activated Carbon (GAC) Treatment System.

Health and Safety

Health and safety issues were raised concerning fugitive process emissions and contaminated dust that may become airborne during IM/IRA implementation and operation. These concerns are addressed by the prevention, personal protection, monitoring, and shutdown procedures presented in the project-specific health and safety documents.

Ground-Water Extraction Treatment

Several comments recommend the use of the Building 231 GAC Adsorption/Building 374 Evaporation Systems for treatment of any ground water that may be generated during pilot testing. This recommendation is based on the lack of contaminant removal performance data for the South Walnut Creek Basin facility.

This Responsiveness Summary provides a comparison of the contaminant removal capabilities of the three candidate water treatment options as well as the benefits associated with their use in the Subsurface IM/IRA (please see Response to Comment 28). Additional rationale for the selection of the South Walnut Creek Basin Surface Water Treatment System in the proposed Subsurface IM/IRAP/EA is provided. In general, the selection is based on expected treatment system contaminant removal capabilities, mixed waste generation, and proximity of the treatment systems to the proposed test areas. Use of the South Walnut Creek Basin facility is contingent upon actual system performance, which will be examined during the pilot testing program. Pilot testing of the South Walnut Creek Basin IM/IRA facility began on 27 April 1992, and results are expected well in advance of start-up of the first Subsurface IM/IRA pilot test, which is scheduled for 03 May 1993.

2.1 VERBAL COMMENTS RECEIVED DURING PUBLIC MEETING

COMMENTER: **KEN KORKIA**
Technical Assistant for the Rocky Flats Cleanup Commission
1738 Wynkoop Street, Suite 302
Denver, Colorado 80202

Comment 1

Overall, the concept of remediating soil contamination in situ is the most appealing aspect of this plan. Given the alternative of having to remove contaminated soil and treating it as a waste material, the Department of Energy is encouraged to continue its research with techniques like this in situ vacuum-enhanced vapor extraction presented in this interim measure.

The use of the observational streamlined approach also is commendable, should its application lead to quicker solutions for soil and water remediation.

Perhaps the biggest surprise in reviewing this document is the revelation that the previously anticipated Interim Measure/Interim Remedial Action Plan/Environmental Assessment for the Woman Creek Basin was review by CDH and EPA with the judgement being made that the contamination in the Woman Creek seeps do not present an immediate threat to the public's health or the environment, and that No Action Alternative was selected. Where was the public's participation in reviewing and commenting on this decision?

Response to Comment 1

As discussed in Response to Comment 27, a rigorous evaluation of the human health and environmental impacts associated with the contaminated Woman Creek Basin surface water seeps was conducted. The findings lead to pursuit of the Subsurface IM/IRA in lieu of the Woman Creek Basin IM/IRA. Although the rationale for the change in direction of the OU2 IM/IRA is sound, DOE recognizes its failure to inform the public or TRG on this important issue. The draft Woman Creek Basin IM/IRAP/EA is available to the public via the public reading rooms.

Comment 2

The following are specific comments related to this document.

It is understood through the description of the observational streamlined approach that the complete data is not available in making many of the decisions. Also mentioned is the fact that the Phase II Remedial Investigation for OU2 is ongoing, and information will be incorporated as it is developed. I would strongly encourage that every effort is made to maintain strong links of communication between the remedial investigation and interim measure groups.

Response to Comment 2

At the time of the writing of the IM/IRAP/EA very little of the Phase II RI data were available. All Phase II RI data that are available during preparation of the Test Plans will be considered in order to strategically locate the test sites, and to design a pilot system that will provide the requisite data for the feasibility study. Nevertheless, there will be uncertainties, and the observational streamlined approach will be tailored to the "new" expected conditions. The RI and interim measure groups will interact significantly in preparation of the test plans. In fact, the EG&G OU2 manager is in charge of both programs which will greatly facilitates this interaction.

Comment 3

The concern expressed by the Colorado Department of Health in its letter in the Executive Summary must be addressed. As long as site-specific standards have been promulgated by the Colorado Water Quality Control Commission, Rocky Flats has no other alternative but to accept these standards as ARAR's.

The nation's credibility of the Department of Energy is challenged each and every time this issue of the site standards being more stringent than the State standards is brought up. Please, listen to the public and not your attorneys.

If the Water Quality Control Commission, as representatives of the people of this State has set standards which specifically apply to Rocky Flats, then the public expects and demands that these standards be met.

Thus, the Colorado Department of Health is encouraged to remain inflexible on this issue.

Response to Comment 3

Please see Response to Comment 14.

Comment 4

In several places in the document, references are made as to the future land use in the Buffer Zone; in one instance being described as being a green belt, and that neither action nor non-action will have an impact on future long-term land use. These references seem to indicate a unilateral position on the part of the Department of Energy. It is hoped that future land use decisions are not already predetermined, and that the community will have an equal say in what the land uses might be, and what level of cleanup is desirable.

Response to Comment 4

Transition planning on future RFP land uses is being conducted at this time. Risk assessment plans to support this effort include quantifying public health and environmental risk for both residential and ecological reserve (green belt) future use scenarios. The actual future land use will be determined by the remedial alternative selected and the level of protectiveness afforded by the alternative, i.e., it will be a risk management decision. A Proposed Plan is prepared for each operable unit before final remediation is undertaken. The Proposed Plan will present the preferred remedial alternative and all supporting data that demonstrates the remedial action would comply with the provisions of CERCLA/SARA (Superfund Amendments and Reauthorization Action of 1986). This would include data and interpretation showing reduction in public health and environmental risks consistent with remediation goals protective of the future land use. The public will be invited to comment on this Proposed Plan.

Comment 5

It is unclear how technologies, other than the in situ vacuum enhanced vapor extraction will be incorporated into this interim measure. In situ steam stripping is mentioned as also being considered for this IM/IRA, without any additional information being provided.

Given the fact that steam stripping will mobilize radionuclides in the area that is already famous for having been the greatest contribution to off-site contamination, there is great concern in how this technology will be incorporated.

It is hard to provide acceptance for this interim measure without a better explanation of this technology. An explicit guarantee must be made that steam stripping will not be incorporated without a full public review process of the Lawrence Livermore test data. Similar reviews should be made available for other in situ technologies that may be attempted in the future.

The majority of the information that is critical to making judgements about the health and safety aspects of this interim measure will not be available until the test plan is written. The document states that this plan will be available for public review, but will not be subject to formal public comment.

Because of the importance of the health and safety information, the public must have some opportunity for review and comment.

I would recommend that the Technical Review Group, at the very least, be given the opportunity to review this test plan in the same time frame in which the regulators are reviewing it. Because of the reputation of areas like the 903 Pad, we the public are greatly concerned about any activities that might disturb the site, and allow further contamination.

Response to Comment 5

As mentioned in Response to Comment 1, it is not practical to involve the public in all decisions that affect environmental restoration activities at the RFP. DOE shares your concern regarding mobilization of radionuclides through *in situ* steam stripping. Data gathered by the LLNL together with data collected during the *in situ* vapor and ground-water extraction tests will be used to determine the appropriateness of *in situ* steam stripping for remediation of the 903 Pad site and others, and the degree of public health protection afforded during testing of this technology. All remedial actions at the RFP, including pilot testing, are conducted with great caution in accordance with test plans and health and safety plans that undergo extensive technical review by EG&G, DOE, EPA, CDH, and their consultants. Your suggestion that the Test Plans and supporting data from LLNL be reviewed by the TRG is a good one. The Test Plans and significant treatability testing results relevant to the Subsurface IM/IRA project will be made available to the TRG and will also be discussed at the DOE Quarterly meetings.

COMMENTER: [redacted]

Comment 6

Overall, I feel the document is excellent in terms of its concept of trying to treat the contaminants in situ, and I think if we can perfect that technology, I think we're way ahead in terms of the cleanup process at Rocky Flats.

I do have a concern that we comply with the site-specific standards that the Colorado Water Quality Control Commission has established for this site. So, I encourage the DOE to comply with those standards and use those as the ARAR's.

Response to Comment 6

Please see Response to Comment 14.

Comment 7

I have a concern that the radionuclides may mobilize during the vapor extraction process. So, I know the emphasis now is VOCs and extracting VOCs, but I hope you also monitor for the mobilization of any radionuclides as you push that ground water out and that we don't increase the flow or worsen the situation by moving those radionuclides out of the area. So, I hope you have enough perimeter wells around the test site to be able to monitor the situation, not only of the VOCs but any of the radionuclides in the test area.

Response to Comment 7

Existing monitor wells will be used to assess changes in hydraulic conditions and ground-water quality during conduct of the testing. Extraction of vapors or ground water is not expected to mobilize radionuclides. Also, plutonium and other radioactive and non-radioactive constituents will be measured in the extracted water. Real-time and near real-time analytical techniques will be used in the field, where appropriate, to obtain data much faster than what can be provided by an off-site analytical laboratory. This will be necessary to ensure that the treatment system designated for treating this water is suitable for the types and concentrations of contaminants present. The testing program will be designed so that the risk of spreading radiochemical contamination is significantly minimized.

Comment 8

Finally, I would encourage you to present the results of this information -- or results of these tests that occur over time, at least in the quarterly forum so that the public can

understand how well the experiments are going and what's being done to monitor the situation and adjust the experiments over time. So, I would encourage that forum be used at least, as well as the Technical Review Group, to maybe chew on the data a little more closely than the public might with the time available at the quarterly review session.

Response to Comment 8

See Response to Comment 5.

COMMENTER: [redacted]

Comment 9

My concern is that you're going too far with an idealized hypothesis, and you haven't taken advantage of the structured engineering work that DOE and EPA have provided you. Namely, the feasibility investigation and the study that follows it.

I haven't seen any — of where those plumes are migrating to, and it wouldn't surprise me if you found a pot of mercury down there. Until you do some hard investigation, you can't legitimately promote, propose, and spend a lot of money on a hypothetical situation, idealized or not.

The drawings I've seen on the wall are not correct. They don't fit the existing geologic data, so I would ask that you go back and follow the structured engineering plan that was set out 20 years ago for finding this data and provide it to the 10,000 engineers in Colorado, and ask for their critique. They'll damn sure tell you what they know. We've got the finest geologists and hydrologists, and all the other engineering disciplines represented in this State in these universities around here. But, I don't see your data coming out.

You give us this crap that says, "The public has not been endangered; we're going to make a safe plant safer"; all that stuff. That scares the hell out of us. Give us some hard data on what those wells showed.

Response to Comment 9

It appears that we have given you the impression that the IM/IRA is an independent effort not tied to the ongoing remedial investigation/feasibility study (RI/FS) for OU2. It also appears that you believe the IM/IRA is based on hypothetical conditions and limited information. On the contrary, the IM/IRA is an integral part of the RI/FS. All RI data will be used to locate and design the IM/IRA, and the results from the IM/IRA will be used in the FS to determine the

preferred remedial alternative for OU2. It is true that the IM/IRA Plan is conceptual in nature and is based on limited existing information. The purpose of the IM/IRA Plan is to inform the public on the rationale for the remedial concept being proposed and any potential impacts that could result from its implementation. The Test Plans (design documents) for the IM/IRA will be detailed and will be based on the latest RI data. Also, the IM/IRAP/EA was critiqued by geologists, engineers, chemists, and other environmental professionals. Their comments were incorporated into the version released to the public. A critical review of the Test Plans will also be conducted prior to implementation of the IM/IRA.

Lastly, all RI data that are discussed in the IM/IRA are provided in Volume II, Appendices. Every attempt has been made to be forthright about the data with respect to the nature and extent of contamination, and the implications of this data with respect to the public welfare. Also, a blueprint for RI/FS activities at OU2 is provided in the RI/FS work plan. This document is available for review at the DOE public reading rooms.

2.2 WRITTEN COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

COMMENTER: COLORADO DEPARTMENT OF HEALTH

Comment 10

> **Executive Summary - page EX-2:**
> *The second paragraph on this page states that "project success will be judged by the usefulness of the data that are collected with respect to final remedial design, not by the degree of cleanup achieved." While the division agrees with the first portion of this statement, we also feel that the degree of cleanup achieved will be an important consideration in judging project success.*

Response to Comment 10

The statement that "project success will be judged by the usefulness of the data collected with respect to final remedial design, not by the degree of cleanup achieved" makes a distinction between the success of the Subsurface IM/IRA project and the effectiveness of vapor extraction technology in remediating OU2 soils. The success of the IM/IRA will be gauged by the quality and usefulness of the remedial data that are collected. Properly designed and executed vapor extraction pilot tests that indicate that vapor extraction technology is not effective for *in situ* cleanup of OU2 soils are equally useful in feasibility study (FS) technology evaluations as tests that indicate a high degree of effectiveness.

Comment 11

Section 1.1 - page 1-5:
Installation and start-up of the chemical precipitation/microfiltration units for the Walnut Creek Surface Water IM/IRA have now occurred. The dates for the start-up should be incorporated into the second paragraph on page 1-5.

Response to Comment 11

Installation of the chemical precipitation/microfiltration units was completed on 24 April 1992, and system start-up occurred on 27 April 1992. This background information will be added to Section 1.1 of the Subsurface IM/IRAP/EA.

Comment 12

Figure 2-7:
Please revise this figure to include data from a more recent sampling event than April 4-8, 1988. This 1988 data may or may not reflect current conditions. Since IM/IRA implementation decisions will be made on more recent data, the recent data should be included in this document.

Response to Comment 12

This figure was included in the IM/IRA as background information only, and will not be used to locate or design the vacuum-enhanced vapor extraction system. The test locations for this action will encompass less than one-tenth acre; therefore, the scale of Figure 2-7 is too small to be useful in the detailed siting or design of the test system(s).

Detailed analyses of ground-water depth and flow direction will be conducted during test plan development using current data on small areas identified as potential test locations. Actual design of the vapor extraction wells (length of well screen, length of blank casing, etc.) will be made in the field based on information gathered during the advancement of boreholes for the extraction wells.

Comment 13

Figures 2-12 through 2-17:
These figures are inadequate. Updated versions of these figures need to be included in any subsequent version of this document and should include:

1) *An indication next to appropriate well locations delineating which wells were dry.*
2) *An indication next to appropriate well locations delineating which wells had "zero" or non-detect for the particular mapped contaminant.*

3) *A reinterpretation of the contours based upon the inclusion of the above information and past information. Because this IM/IRA may be used to aid design and choice of a final remedy, these updated isoconcentration contour maps should:*

   a) *include either a "zero" contour or a contour at the value of the ARAR.*

   b) *have consistent contour intervals over all areas of each map (i.e., different maps can have different contour intervals, but each map should be consistent over the entire map).*

   c) *make an effort to interpret contaminant concentrations beyond the last data point. This could include pointing the plume at the most reasonable source, closing contours when reasonable, incorporating knowledge of past sampling events to extend contours when possible, etc.*

Response to Comment 13

The presence of dry wells and "clean" ground water were considered when preparing the isoconcentration contours. It was decided to omit such notations to maintain clarity on the figures. Specific responses to these comments follow:

1) "DRY" will be indicated next to the appropriate wells on the isopleth maps that will be included in the final Subsurface IM/IRAP/EA.

2) "ND" (not detected) will be indicated next to the appropriate wells in the final IM/IRAP/EA. There are no third quarter 1991 chemical data for some of the wells plotted on the isopleth maps. In this case, the notation "NA" (not available) will be place next to the well.

3a) A zero contour is included on all isopleth maps where data are available to guide its placement.

3b) Due to the range of contaminant concentrations detected in ground water, use of similar contour intervals for each contaminant plume on a given isopleth map would result in either insufficient detail to show the shape of the individual plume, or contours so tightly spaced that individual contours could not be resolved.

3c) At the time the isopleth maps were developed, little or no chemical information was available regarding contaminant concentrations at the source areas making it difficult to close contours near the source areas. However, where reasonable, an attempt was made to close the contours (specifically in the downgradient direction) and "point" the individual contaminant plume towards its suspected source area. For example, contours were left "open" on the upgradient side of the contaminant plumes near the 903 Pad because no monitoring wells had been installed in the Pad itself. The Phase II Alluvial RI included the installation of monitoring wells within the 903 Pad. Analytical data for ground-water samples from these wells will be utilized to further define the conditions at the proposed test sites.

Comment 14

Section 3.3.2:
The Division disagrees with this section as is outlined in our letter included in the Executive Summary. Further discussions on this matter will be necessary before the Division can approve a final version of this document in August, 1992.

Response to Comment 14

The DOE appreciates the position the CDH has taken with respect to the development of ARARs. As discussed in recent communications with the CDH, DOE has been evaluating approaches to establishing ARARs. It is anticipated that these discussions will continue. At the present time, DOE offers the following responses to the comments presented in the letter from CDH dated 12 March 1992, which was included in the Executive Summary of the final proposed Subsurface IM/IRAP/EA:

Item A

Because of the uncertain chemistry of the ground water that may be recovered beneath the pilot study areas, a comprehensive list of chemical-specific ARARs needs to be proposed. This list could include the Target Analyte List (TAL) Metals, and the Target Compound List (TCL) Volatiles and Semi-Volatiles, but should include any constituents for which there are standards.

Response to Item A

The commenter is correct in emphasizing that a variety of contaminants may be encountered in OU2 ground water during IM/IRA pilot studies. It was for this reason that the DOE reviewed all available analytical data to develop a comprehensive list of all parameters detected in OU2 ground water. Data for OU2 ground water includes the results of nearly 6 years of ground-water quality investigation. It is DOE's position that providing ARARs for all parameters detected is consistent with CERCLA. Pursuant to the National Contingency Plan (NCP) and EPA guidance, when scoping RI/FS activities, it is appropriate to identify all available standards for all possible contaminants to serve as guides for collection of meaningful data using appropriate sampling methods and detection limits.

However, when developing governing criteria for technology studies or remedial alternatives screening, EPA and CERCLA clearly indicate that these criteria provide for efficient and expeditious studies. Criteria used to govern technology studies such as the IM/IRA should accordingly include ARARs developed for the specific parameters that may reasonably be expected to be encountered in the study. Establishing ARARs for this IM/IRA for an exhaustive list of parameters, many of which have never been identified anywhere at the RFP, is inappropriate. Such a listing of potential ARARs (or benchmarks; see Response to Comment 25) is, however, suitable for ensuring that

analytical detection limits used for remedial investigations are sufficiently sensitive to produce data that can be compared to various regulatory standards.

Item B

The Colorado Water Quality Control Act is applied consistently throughout Colorado by the Water Quality Control Commission (WQCC). The resulting standards differ by stream segment for a variety of reasons including different classified uses needing protection and variations in natural background water quality. Therefore, even though Rocky Flats has segment-specific standards for Walnut Creek and Woman Creek the state statute and regulations and methodology for arriving at these standards are generally applicable throughout the state. In addition, segment-specific standards are enforceable through State and Federal statutes and through NPDES permits. Therefore, all WQCC standards should be included in this document as ARAR.

Response to Item B

As discussed above, the DOE is currently preparing a consolidated ARAR approach that it intends to offer to CDH in the near future. The DOE is deferring its response to this comment until the approach is fully developed. However, for the purposes of the IM/IRA, the DOE will adhere to the effluent limitations established for any water treatment facility to which extracted ground water is sent during the pilot studies (see Response to Comment 24). As such, ARARs need not be an issue to be resolved for approval of the IM/IRAP/EA.

Item C

A goal qualifier indicates that "the waters are presently not fully suitable but are intended to become fully suitable for the classified use." It is important to note that the goal qualifier for classified uses results in only a temporary modification to numerical standards. The possible active lifetime of this IM/IRA will almost certainly outlast the current temporary modifications. Therefore the "goal" qualifier cannot be used to abrogate certain standards to TBC status.

Response to Item C

The commenter is correct in that the goal qualification of the numerical standards for RFP surface waters is temporary. Nevertheless, the referenced goals are not promulgated standards for the purposes of ARARs determinations. Consequently, these goals cannot be identified as ARARs according to the NCP requirements for state ARARs as provided in 40 CFR (Code of Federal Regulations) 300.400(g). When numeric standards are promulgated for RFP surface waters, which may be different than the current goals, these standards may be considered ARAR depending on other exigencies related to the ARARs determination. See response to previous comment.

Comment 15

Section 4.1:
The sentence that begins on the bottom of page 4-6 and continues on the top of page 4-7 appears to contain an error. Water table depression will not be applied at 10 sites.

Response to Comment 15

The sentence noted in the comment will be corrected to read "Water table depression efforts will be applied only at those sites where a significant saturated thickness exists (> 3 feet)."

Comment 16

Figure 4-6:
Either the text or this figure needs to make clear that this will be a new treatment system constructed specifically for this IM/IRA.

To operate this treatment facility, DOE will need to notify the Air Pollution Control Division of the CDH and may have to complete an APEN (Air Pollution Emission Notice).

Response to Comment 16

Clarification that the vapor extraction pilot unit (Figure 4-6) must be newly constructed specifically for the Subsurface IM/IRAP will be added to Section 4.3.2.1.

A copy of the final Subsurface IM/IRAP/EA will be forwarded to the Air Pollution Control Division of the CDH. The DOE will also submit any required vapor extraction and treatment unit emission notices prior to system operation.

Comment 17

Section 4.4.2.1:
The last paragraph of this section sites that vapor treatment is discussed in Section 4.5.2.1. This is incorrect. The correct citation is Section 4.3.2.1.

Response to Comment 17

The last sentence in Section 4.4.2.1 has been corrected to state that the proposed vapor treatment system is discussed in Section 4.3.2.1.

Comment 18

Section 4.5.2.1:
See above comment to Section 4.4.2.1.

Response to Comment 18

The last sentence in Section 4.5.2.1 has been corrected to state that the proposed vapor treatment system is discussed in Section 4.3.2.1.

Comment 19

Section 4.6.3:
This section states that the GAC adsorption system planned for construction near building 231B is scheduled for completion in March, 1992. As it is now May, 1992, this statement should be updated to reflect the current status of this project.

Response to Comment 19

The final IM/IRAP/EA will indicate the schedule for implementation of the Building 231 GAC adsorption unit to include system installation and start-up by the end of 1992. The schedule presented in the draft IM/IRAP/EA has been revised because of a delay in procurement of the GAC adsorption system. All contractor design/build bids received by RFP exceeded the funding budgeted for this phase of the project. The bidding process is being revisited at this time with more detailed specifications for the GAC adsorption system.

Comment 20

Table 5-2:
This schedule needs to be expanded to go beyond finalization of the Decision Document. When will implementation begin, etc.?

Response to Comment 20

The activities listed below will be added to the Subsurface IM/IRA schedule presented in Table 5-2. Specific completion dates are listed for IM/IRA activities leading up to the start-up of the pilot unit at the first test site. Due to the uncertainty associated with the actual length of time that will be required to complete the first pilot test, completion dates for activities subsequent to the first pilot test are listed in time durations relative to conclusion of the first pilot test.

Activity	Due Date
Site 1 Pilot Test:	
Submit Draft Test Plan to EPA/CDH	29 October 1992
EPA/CDH Comments on Draft Test Plan	26 November 1992
Submit Final Test Plan to EPA/CDH, and Complete Pilot Unit Bid Package	12 January 1993
Solicit and Complete Evaluation of Subcontractor Bids/Issue Purchase Order	09 March 1993
Finalize Subcontractor Design Drawings/EG&G Issues Authorization to Proceed	26 April 1993
Complete Pilot Unit Installation	03 August 1993
Complete Inspection and System Startup/ Begin Pilot Testing	15 September 1993
Complete Pilot Study	13 weeks after Pilot Study begins
Submit Draft Pilot Test Report to EPA/CDH	24 weeks after Site 1 Pilot Study concludes[a]
EPA/CDH Comments on Draft Pilot Test Report	3 weeks after receipt of Site 1 Draft Test Report
Submit Final Pilot Test Report to EPA/CDH	4 weeks after receipt of EPA/CDH Comments on Site 1 Draft Test Report
Site 2 Pilot Test:	
Submit Draft Test Plan to EPA/CDH	10 weeks after EPA/CDH approves Site 1 Final Test Plan
EPA/CDH Comments on Draft Test Plan	4 weeks after receipt of Site 2 Draft Test Plan
Submit Final Test Plan to EPA/CDH and Complete Pilot Unit Bid Package	9 weeks after receipt of EPA/CDH Comments on Site 2 Draft Test Plan

Solicit and Complete Evaluation of Subcontractor Bids/Issue Purchase Order	8 weeks after completion of Site 2 Pilot Unit Bid Package
Finalize Subcontractor Design Drawings/EG&G Issues Authorization	7 weeks after issuance of Purchase Order
Complete Pilot Unit Installation	14 weeks after a.) EG&G authorization to proceed, or b.) completion of Site 1 Pilot Study, whichever is later.
Complete Inspection and System Startup/ Begin Pilot Testing	6 weeks after installation of Site 2 Pilot Unit Complete
Complete Pilot Study	Within 13 weeks after Site 2 Pilot Study begins.
Submit Draft Pilot Test Report to EPA/CDH	24 weeks after Site 2 Pilot Study concludes[a]
EPA/CDH Comments on Draft Pilot Test Report	3 weeks after receipt of Site 2 Draft Test Report
Submit Final Pilot Test Report to EPA/CDH	4 weeks after receipt of EPA/CDH Comments on Site 2 Draft Test Report

Site 3 Pilot Test:

Submit Draft Test Plan to EPA/CDH	10 weeks after EPA/CDH approves Site 2 Final Test Plan
EPA/CDH Comments on Draft Test Plan	4 weeks after receipt of Site 3 Draft Test Plan
Submit Final Test Plan to EPA/CDH, and Complete Pilot Unit Bid Package	9 weeks after receipt of EPA/CDH Comments on Site 3 Draft Test Plan
Solicit and Complete Evaluation of Subcontractor Bids/Issue Purchase Order	8 weeks after completion of Site 3 Pilot Unit Bid Package

Finalize Subcontractor Design Drawings/EG&G Issues Authorization to Proceed	7 weeks after issuance of Purchase Order
Complete Pilot Unit Installation	14 weeks after a.) EG&G authorization to proceed, or b.) completion of Site 2 Pilot Study, whichever is later
Complete Inspection and System Startup/ Begin Pilot Testing	6 weeks after installation of Site 3 Pilot Unit Complete
Complete Pilot Study	12 weeks after Site 3 Pilot Study begins.
Submit Draft Pilot Test Report to EPA/CDH	24 weeks after Site 3 Pilot Study concludes[a]
EPA/CDH Comments on Draft Pilot Test Report	3 weeks after receipt of Site 3 Draft Test Report
Submit Final Pilot Test Report to EPA/CDH	4 weeks after receipt of EPA/CDH Comments on Draft Test Report

[a] Schedule assumes 80 days for turnaround of analytical laboratory data.

Comment 21

Appendix C:
For any chemical parameter that does not have a specific regulatory standard, RCRA Subpart F "background" should be TBC.

Response to Comment 21

The RCRA ground-water requirements do provide an effective mechanism for the protection of potential drinking water sources. As required by 40 CFR 264 Subpart F, concentrations of specified constituents leaking from regulated hazardous waste management units are not allowed to exceed Maximum Contaminant Levels (MCL) or background, where MCLs do not exist, in the uppermost aquifer. Although the DOE believes that application of RCRA ground-water requirements to surface water discharges is inappropriate, it is the desire of DOE to protect all potential sources of drinking water, whether ground-water or surface water sources. To reflect this desire, the text of the IM/IRAP/EA has been revised to provide for the use of background concentrations as DOE goals for any parameters that do not have a specific regulatory standard.

These DOE goals will be included in the discussions of "To Be Considered" (TBC) guidance and criteria.

Comment 22

> **Appendix C:**
> *No state standard cited in this appendix should be TBC. See comment on Section 3.3.2 above.*

Response to Comment 22

Please see Response to Comment 14.

Comment 23

> **Appendix C:**
> *ARARs should never be listed as default detection limits. The ARAR is a regulatory standard. Whether or not treating and detecting is practical should be considered in the waiver process.*

Response to Comment 23

The commenter is correct in pointing out that the technical impracticability of achieving ARARs or the inability to measure the achievement of ARARs is grounds for a waiver of an ARAR. As provided in 40 CFR 300.430(f)(1)(ii)(C) of the NCP, when selecting remedies, waivers may be invoked when one of six conditions exist, including when "compliance with the requirement is technically impracticable from an engineering perspective." Thus, if analytical measurement of ARAR concentrations is technically impossible, the absence of such confirmatory data will render achieving the ARARs impracticable from a remedial engineering perspective, and therefore, would require that an ARAR waiver be invoked.

DOE understands that the numeric standard, and not the detection limit, is the ARAR. Table C-1 will be modified to reflect this concept. However, the detection limit will also be shown and marked with a footnote stating that until such time as analytical technology is reasonably available to allow measurement of compliance with these ARARs, achievement of the detection limits is considered to reflect regulatory compliance. This interpretation is consistent with various regulatory programs, including the surface water protection program established by the Colorado Water Quality Control Commission (WQCC). Section 3.1.14(9) of the Basic *Standards for Surface Water* provides that where water quality standards fall below Practical Quantitation Limits (PQLs), then the PQLs are to be used as a measure of compliance with CDH surface water regulations. The text of Section 3 will be revised to clarify this issue.

Comment 24

Appendix C.
We suggest that the ARAR tables presented in the final IM/IRA Decision Documents for the OU1 IM/IRA and the OU2 Surface Water IM/IRA be included in this document, listed separately. This would avoid confusion from both a regulatory and implementation point of view when a decision is made on which treatment facility will treat any produced ground water.

Response to Comment 24

As noted in the Response to Comment 14, DOE is currently preparing a consolidated ARAR approach that it intends to offer to CDH in the near future. However, DOE agrees with the comment that for the purposes of the IM/IRA it is appropriate to comply with the effluent limitations established for any water treatment facility to which extracted ground water is sent during the pilot studies. Therefore, the ARAR tables from the referenced IM/IRA Decision Documents will be included in Appendix C, and all references in Section 3 and Appendix C to either surface or ground-water ARARs will be deleted except as noted below.

It is recognized that there may be compounds in OU2 ground water not addressed by the ARARs established for the OU1 and OU2 treatment facilities. ARARs will be established for these compounds using the most stringent ARAR "philosophy" from the OU1 and OU2 IRAPs that defined each treatment facility's ARARs. However, this will not be considered as precedent setting for the consolidated ARAR approach forthcoming.

Comment 25

Appendix C:
We suggest that DOE's new "Benchmark" tables be used as a source for the specific standard values proposed for ARAR status. There are many errors in this appendix that could have been avoided if the benchmark tables were used. These errors are itemized as follows:

Parameter	ARAR ug/l	Reference
Methylene chloride	4.7*	WQCC Statewide surface water standard; water and fish ingestion
Chloroform	0.19*	CWA AWQC Protection of Human Health; Water & fish ingestion
1,2-DCE (tot)	5**	
Benzene	0.66	CWA AWQC Protection of Human Health; Water & fish ingestion

Parameter	*ARAR ug/l*	*Reference*
Antimony	14*	WQCC surface water standard; statewide domestic water supply
Arsenic	.0022*	CWA AWQC Protection of Human Health; Water & fish ingestion
Beryllium	.0022*	CWA AWQC Protection of Human Health; Water & fish ingestion
Cadmium	1.1*	CWA AWQC Protection of aquatic life; chronic
Chromium	50	SDWA MCL
Chromium III	10**	
Chromium V	10**	
Cobalt	0.05***	WQCC statewide ground-water standard.; agricultural
Copper	12*	CWA AWQC Protection of aquatic life; chronic
Iron	300*	SDWA MCL
Lead	3.2*	CWA AWQC Protection of aquatic life; chronic
Lithium	2,500	WQCC statewide ground-water standard.; agricultural
Manganese	50*	SDWA MCL
Mercury	0.01*	WQCC Segment standards; protection of aquatic life; chronic
Nickel	13.4*	CWA AWQC Protection of Human Health; Water & fish ingestion
Selenium	5*	CWA AWQC protection of aquatic life; chronic

Parameter	*ARAR ug/l*	*Reference*
Silver	0.12	CWA AWQC protection of aquatic life; chronic
Thallium	0.012	WQCC surface water standard; statewide domestic water supply
Vanadium	100	WQCC statewide ground-water standard.; agricultural
Zinc	50**	CWA AWQC Protection of aquatic life; chronic
Chloride	250,000	SDWA MCL
Sulfate	250,000	SDWA MCL
TDS	250,000*	CWA AWQC Protection of Human Health; Water & fish ingestion
Fluoride	2,000	WQCC surface water standard; statewide domestic water supply
Gross Alpha	7 pCi/l	WQCC segment specific radionuclide std.
Gross Beta	5 pCi/l	WQCC segment specific radionuclide std.
Pu	0.5 pCi/l	WQCC segment specific radionuclide std.
Tritium	500 pCi/l	WQCC segment specific radionuclide std.
Uranium (tot)	5 pCi/l	WQCC segment specific radionuclide std.
Am	0.05 pCi/l	Was listed as ARAR in Walnut Creek IM/IRA; should be same
Cs	1,000	NRC effluent std.

* delineates ARAR values more stringent than those proposed in the Walnut Creek Surface Water IM/IRA. Therefore, if the produced ground water from this IM/IRA goes to the Walnut Creek IM/IRA, ARARs for that IM/IRA would apply. However, if the produced ground water goes to an alternate treatment facility, the ARAR values listed here would apply. This concept would also apply to the correctly listed ARAR standards for PCE, TCE, and 1,1-DCE. (A comparison to the OU1 IM/IRA was not undertaken. We expect a similar situation to arise; hence our general Comment 4 [Comment 24] above.)

** delineates an ARAR that is already applicable for the Walnut Creek Surface Water IM/IRA, even though there are less stringent standards that either were missed and should have been the ARAR, or have been subsequently superseded by less stringent standards.

*** delineates an ARAR for a constituent that was not included in this IM/IRA, but needs to be added.

Response to Comment 25

The DOE's new "Benchmark" tables represent the universe of environmental standards and criteria that exist for an exhaustive list of chemicals that are being measured in RFP ground water and surface water. These tables are a valuable tool for ensuring that appropriate analytical detection limits are used in remedial investigations; however, DOE disagrees with the commenter's assertion that "errors" in Appendix C could have been avoided through the use of the "Benchmark" tables.

The "Benchmark" tables present only surveys of available thresholds. No ARARs analyses or rationale for the selection of ARARs is presented in the tables. Upon review, DOE finds that the Appendix C-2 tables are largely consistent with the "Benchmark" tables. Most of the "errors" identified in the comment reflect the DOE and CDH differences in approach to determining ARARs as presented in Table C-1 (see Response to Comment 14). As discussed in the Responses to Comments 14 and 24, DOE will comply with the effluent limitations required at any of the on-site water treatment facilities to which it sends extracted ground water during the subsurface IM/IRA. Therefore, the addition of the "Benchmark" tables is neither appropriate nor necessary.

Comment 26

Appendix E

The analysis presented here needs to be tied to the soil thresholds calculated in the PPCD. The project manager for this IM/IRA needs to follow the protocols outlined in the PPCD to make sure emissions from IM/IRA implementation do not exceed allowable levels.

Response to Comment 26

The soil contamination data currently available for radionuclides, VOCs, and metals are presented in Appendix A. These data suggest that the levels of all compounds detected in the soil remain well below the soil thresholds calculated in the Plan for Prevention of Contaminant Dispersion (PPCD) for drilling activities and vehicular traffic. For example, plutonium 239/240 levels at the 903 Pad were found to range from 0.020 picocuries per gram (pCi/g) to 500 pCi/g. Thus, the highest level recorded is one order of magnitude below the soil threshold for vehicular traffic recommended in the PPCD and more than two orders of magnitude below the soil threshold of 68,200 pCi/g for well drilling. A similar situation exists for compounds detected

at the Mound and East Trenches areas. Therefore, on the basis of existing data, neither well drilling nor vehicular traffic associated with the IM/IRA are expected to present significant health risks due to chemical exposure.

It is possible that ongoing soil analysis at OU2 associated with the RI will discover pockets of higher chemical contamination. In this event, the data from soil analyses will be compared to the PPCD soil thresholds. If soil thresholds are exceeded or if real time air monitoring suggests a potential problem, then mitigation measures including unpaved road-wetting applications will be implemented.

COMMENTER: CITY OF WESTMINSTER

Comment 27

The City of Westminster is concerned that remediation plans for OU2 no longer include the collection and treatment of seeps in the Woman Creek drainage basin, but instead, the regulatory agencies propose that subsurface water be pumped from three areas within OU2, and treated at the South Walnut Creek Treatment System. Westminster understands that information gained during this process will aid in the selection and design of the final cleanup remedy, however, this procedure will most likely take years to complete, and meanwhile, the seeps continue to flow uncontrolled into Woman Creek.

Response to Comment 27

The originally conceived surface water IRAP for OU2 included collection of surface water in the South Walnut Creek drainage and seeps in the Woman Creek drainage, and treating the collected water in a centralized treatment facility that would discharge effluent to the South Walnut Creek drainage. Strong public opposition to the interbasin transfer of water (Woman Creek to South Walnut Creek) led to the separation of the IM/IRA into two projects: a South Walnut Creek Basin Surface Water IM/IRA, and a Woman Creek Basin Surface Water IM/IRA. The South Walnut Creek Basin IM/IRA has been implemented; however, the need for the Woman Creek Basin IM/IRA was re-evaluated.

When the original surface water IM/IRA was defined, the Woman Creek seeps were targeted for collection simply because of the presence of solvents and above background plutonium concentrations in the water. A conceptual model of the fate of these contaminants and the corresponding risk to the public had not been formulated at that time. Assuming highly conservative public exposure scenarios (all the solvents are volatilized, transported to the property boundary, and are inhaled by a member of the public; direct consumption of Pond C-2 water assuming the present contamination arises entirely from the seeps), DOE quantified human health risks that indicate the seeps pose a low risk to the public. In accordance with EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30, the calculated risks are insufficient to trigger an IM/IRA. There are also no adverse environmental impacts resulting from the seeps. Further, seepage flow into the South Interceptor Ditch has never been observed, and seep flows are seasonal and were barely perceptible during the spring of 1991. Therefore,

DOE concluded that no action was appropriate, and remediation of the seepage could await the final remedial action for OU2. These findings were presented to EPA and CDH. The regulatory agencies concurred with the risk findings but disagreed that no action was appropriate solely on the basis of low human health and environmental risks, i.e., the OSWER Directive also states that operation of an IM/IRA that provides information useful to the design of the final remedy is an important consideration for conducting an IM/IRA. It was therefore agreed amongst all parties that the subsurface IM/IRA be pursued as a more prudent use of the resources being applied to the investigation and remediation of OU2.

EPA and DOE are responsible to the public for making judicious decisions such as this one in order to avoid unnecessary expenditure of federal (public) funds in environmental restoration. The proposed subsurface IM/IRA will provide for early establishment of the effectiveness of the *in situ* treatment processes. This in turn will expedite remediation of the site by virtue of the remediation effected by the IM/IRA, and the subsequent focused full-scale design efforts if the technology is successful. It will also expedite remediation by early redirection of remedial planning efforts if the technology is determined to be ineffective relative to other technologies.

Comment 28

The South Walnut Creek Treatment System and the 881 Hillside Ground water Treatment System are newly constructed treatment facilities designed with the purpose of treating contaminants specific to their areas. Westminster has not received any test results which demonstrate the ability of those facilities to adequately remove contaminants, which are believed to be present under the 903 Pad Area. Since the success of those treatment facilities in removing plutonium and americium is not proven, and those treatment facilities were designed to treat contaminated water with a somewhat different water chemistry, the introduction of contaminants which those systems cannot adequately remove could jeopardize water quality in Woman Creek and Standley Lake. Westminster recommends that the extracted subsurface water should be delivered to Building 231B GAC Adsorption System/Building 374 Evaporation System which may be better suited to treat the level and type of radionuclides extracted from under the 903 Pad Area.

Response to Comment 28

The contaminant removal capabilities of the RFP treatment facilities proposed for processing any ground water recovered during the Subsurface IM/IRA are summarized below.

Treatment System	OU2 Contaminant Types Removed
South Walnut Creek Basin Surface Water IM/IRA	VOCs, radionuclides, and metals
881 Hillside Ground-Water Treatment System	VOCs, uranium, and metals

Building 231 GAC Adsorption System/Building 374 Evaporation System	VOCs, radionuclides, and metals

Although all three of the ground-water treatment alternatives listed above are being retained for consideration in the Subsurface IM/IRA, the South Walnut Creek Basin Surface Water Treatment System is proposed at this time for several reasons. First, the South Walnut Creek Basin Treatment System has been designed to address all of the OU2 contaminants of concern. This design is not dependent on the chemistry of the influent as it is adjusted in the first two unit operations of the system. As noted in the Response to Comment 11, pilot testing of the complete South Walnut Creek Basin Treatment System (radionuclide/metal and VOC removal units) began on 27 April 1992. Contaminant removal performance data should be available well in advance of start-up of the Subsurface IM/IRA at the first test site (see Subsurface IM/IRA schedule presented in Response to Comment 20). The South Walnut Creek IM/IRA Treatability Study Report will be submitted to the TRG for review. DOE has no intention of using an unproven South Walnut Creek treatment system to process ground water recovered during the Subsurface IM/IRA.

The Building 231/Building 374 treatment alternative addresses all of the OU2 contaminants of concern. However, use of the South Walnut Creek Basin Surface Water Treatment facility to treat all of the OU2 contaminants requires one-half of the number of tank truck trip miles transporting potentially contaminated ground water. Also, the South Walnut Creek treatment facility is located the shortest distance from all three proposed test sites. In considering the use of the South Walnut Creek Basin IM/IRA facility for treating ground water recovered during pilot testing at the 903 Pad, it is important to note that a portion of the ground water at the 903 Pad flows towards the South Walnut Creek drainage due to the presence of a potentiometric high at the Pad area. In addition, current surface water management practices involve interbasin transfer of Woman Creek Basin surface water to the South Walnut Creek Basin via the Broomfield Diversion Canal.

A final factor in proposing the South Walnut Creek treatment system over the Building 231/Building 374 treatment systems is the nature of the spent GAC that is expected to be generated by these two treatment systems. The South Walnut Creek Basin Surface Water Treatment System is designed to first remove radionuclides from the ground water, followed by removal of VOCs by GAC. In this configuration, spent GAC is expected to be free of radionuclides, and thus, will be regenerable. In contrast, the Building 231 GAC system would process influent water prior to removal of any radionuclides that may be present. It is, therefore, likely the spent GAC produced will be mixed waste that cannot be regenerated and must be land disposed.

The final selection of the RFP treatment system(s) that will be used to support the Subsurface IM/IRA will be based on the actual contamination observed in recovered ground water and the results of performance testing each of the treatment systems. However, for the reasons discussed above, DOE wishes to retain the South Walnut Creek Basin Surface Water Treatment System as the preferred system at this time. The text in Section 4.6 of the Subsurface IM/IRA will be augmented to include the rationale for this strategy.

Comment 29

In regard to the Applicable or Relevant and Appropriate Requirements (ARARs) issue, the City of Westminster supports the Colorado Department of Health's position on ARARs as documented in their March 12 letter to the United States Department of Energy. Westminster believes that the site specific standards as adopted by the Water Quality Control Commission meet the ARAR criteria and should be included as cleanup ARARs. However, if in the future, a stream classification and/or standard is changed, then the ARAR should reflect that change.

Response to Comment 29

DOE acknowledges the City of Westminster's support of the CDH ARAR position. As noted in the comment and pursuant to the NCP in 40 CFR 300.430(f)(1)(ii), ARARs will be modified in accordance with regulatory changes as necessary to protect human health and the environment. Please see the Response to Comment 14.

Comment 30

The City of Westminster is committed to protecting the water quality in Standley Lake. Downstream users have supported Westminster's efforts to isolate Standley Lake from the Rocky Flats Plant through implementation of the Option B Project which includes construction of the Standley Lake Diversion Project and the Woman Creek Reservoir. Downstream users view that the Standley Lake Diversion Project, in conjunction with the entire Option B Project, provides protection for the South Platte River. It is essential that the Standley Lake Diversion and the Woman Creek Reservoir be in place to isolate Standley Lake, and thus protect downstream users, from an accidental release of contaminants from current or future activities at the Rocky Flats Plant. Thus, the City of Westminster urges the Department to accelerate the funding of the Option B Project so that water quality protection efforts may more quickly be put in place.

Response to Comment 30

As discussed in Response to Comment 27, the seeps (and contents of Pond C-2) pose low risks to the public. Also, Pond C-2 water is not discharged to the Woman Creek drainage, but is pumped to the B-series ponds and treated as necessary for discharge to South Walnut Creek and the Broomfield Diversion Canal. Therefore, until the Option B Project is constructed, measures are in place to isolate Standley Lake (and Great Western Reservoir by virtue of the Broomfield Diversion Canal) from contamination arising from the RFP. The Option B Project and any acceleration of funding is not relevant to this IM/IRA. DOE is aware of the concerns of the Cities of Westminster and Broomfield regarding the Option B Project and would be pleased to discuss the matter fully in a different forum.

COMMENTER: **CITY OF BROOMFIELD**
Number Six Garden Center
Broomfield, Colorado

Comment 31

The City has two major concerns with the document. The first is the issue of Applicable or Relevant and Appropriate Requirements (ARARs) outlined in Section 3. The City of Broomfield fully supports the Colorado Department of Health's position on ARAR's as stated in Gary Baughman's March 12, 1992 letter to Frazer Lockhart. The City strongly urges DOE to work diligently with CDH to resolve this issue.

Response to Comment 31

DOE acknowledges the City of Broomfield's support of the CDH ARAR position. Please see Response to Comment 14.

Comment 32

The second major concern is the proposed use of the South Walnut Creek Treatment System for treatment of the ground water pumped from the three areas within OU2 and the condensate from the vapor extraction process. The South Walnut Creek Treatment System hasn't been in place long enough to establish its effectiveness in treating radionuclides. We have not seen any data to date that indicates that the radionuclide treatment is working. Any upset condition with the treatment facility would allow the contaminated ground water to flow directly into Walnut Creek. The city feels the treatment system at the terminal ponds on Walnut Creek is adequate to treat surface water with low-level radionuclides as it was intended, but not adequately equipped to treat levels of radionuclides that may come from under the 903 pad. There is potential for contamination to reach Great Western Reservoir or down stream users.

Response to Comment 32

Please see the responses to Comments 28 and 30.

Comment 33

The document states several times that the chemistry of the ground water in that area is uncertain. There are separate sections (4.3.2.2, 4.4.2.2, and 4.5.2.2) written to deal with "deviations from expected conditions due to incorrect assumptions with respect to site-specific hydrogeology and nature of contamination based on limited site characterization data" (page 4-41). With your well-documented uncertainties about the quality of the ground water and the relatively small volumes of ground water generated,

it would be prudent to use the Building 231 GAC Adsorption System and the Building 374 Low-Level Wastewater Treatment System. These established systems, as indicated on page 4-78, are well-suited for removal of VOC's, radionuclides and metals that may be present in the Subsurface IM/IRA ground water and condensate. The document states that there is extra processing capacity at both facilities (page 4-78). Broomfield strongly urges DOE to pursue this as the preferred treatment option.

Response to Comment 33

Please see Response to Comment 28.

DOE wishes to emphasize that the South Walnut Creek Surface Water Treatment system will not be used for treatment of ground water recovered during the Subsurface IM/IRA if the performance of the system is not adequately verified for removal of the contaminants of concern.

Comment 34

Broomfield has to continue to protect the Walnut Creek drainage from any additional contaminant loading until the Option B project is in place. It is important that the Option B project be finished in its entirety as soon as possible. Twenty million dollars has been obligated so far in FY91 and FY92. At present, another $40 million is expected in FY93, and the final $13 million in FY94. The City of Broomfield urges the Department to consider accelerating the funding so that full protection can be in place more quickly. This would help avoid concerns of several down stream water users that the Option B project could be only partially completed for many years to come.

Response to Comment 34

Please see Response to Comment 30.

COMMENTER: U.S. ENVIRONMENTAL PROTECTION AGENCY

Comment 35

In addition to the questions and problems raised in the attached comments, EPA would like to urge DOE to make a diligent effort to update the techniques proposed in the IM/IRA as new information and equipment enters the market. For instance, we understand excellent results have been obtained in recent applications of directional drilling and/or air sparging in conjunction with bioventing work. Both these techniques should be thoroughly evaluated for potential applicability to the difficult conditions in OU2, and added as possible techniques for use during the IM/IRA if found appropriate.

Response to Comment 35

Many technologies are potentially applicable at OU2 for remediation of the dissolved phase plume and source area(s). EG&G identified source removal as the most reasonable first step, as removal of source material ultimately reduces the size and "life" of the contaminant ground-water plume. Potential source removal technologies were subjected to a screening process (discussed in Section 4.1 of the Subsurface IM/IRAP/EA) against specific criteria including: the need to address the source of the dissolved contaminant ground-water plume, and to minimize the risk of spreading contamination.

Vacuum-enhanced vapor extraction was selected as the most promising technology because it has the potential to remove source material without significantly disturbing the source area by the injection of fluids or modification of subsurface pH or temperature.

The specific technologies mentioned by the commenter (directional drilling coupled with air sparging and bioventing) were considered either directly or indirectly during the screening process. Air sparging is generally used to address dissolved phase contaminant plumes while the intent of this action is to address source material. Active bioremediation of the vadose zone will require the addition of nutrients (nitrogen and/or phosphorus) in aqueous solution. The infiltration or injection of fluids into the vadose zone creates the risk of mobilizing volatile organic or radioactive contaminants. Additionally, biodegradation of chlorinated compounds usually requires at least one step involving anaerobic biodegradation, which is, in principle, incompatible with venting.

It is likely that some biological degradation of contaminants will occur as a result of the increased flow of oxygen in the subsurface during active venting. However, quantifying the contribution to contaminant removal made by biodegradation is beyond the scope of this effort.

As a final note, several other innovative remedial technologies are being investigated at U.S. DOE facilities across the country. For example, directional drilling and *in situ* air sparging techniques are being pilot tested at the Savannah River Plant in Aiken, South Carolina. The results of such investigations will be input into the RFP FS to determine the applicability of these innovative technologies for final cleanup of the RFP.

Comment 36

> *Before conducting in situ pilot-scale testing for vacuum vapor extraction to treat residual free-phase dense nonaqueous phase liquids (DNAPL) contamination, further data should be gathered on the DNAPL and the environmental conditions. These data should include information on characteristics of the unsaturated zone soil, the underlying claystone or sandstone bedrock, and the DNAPL. Soil and bedrock characteristics that should be evaluated include permeability, porosity, moisture, structure, organic carbon content, and particle size distribution. Characteristics of the DNAPL that should be assessed include the vapor pressure, Henry's law constant, solubility, adsorption equilibrium,*

density, and viscosity. These data will enable more effective design of the vacuum vapor extraction test.

Response to Comment 36

Items critical to performing a vapor extraction pilot test include the location of suspected source material and the contaminant type (volatile vs. non-volatile). Additional information such as those items listed by the commenter would also be useful to the design of a pilot test, but would be more applicable to the design of a final, full-scale remedial system. The absence of detailed test site characterization data should not preclude the performance of a pilot test as the purpose of the test is to determine in a qualitative way, the characteristics of the bedrock, alluvium, and contaminants described by the commenter.

The Phase II RI currently underway at OU2 will provide new, detailed information regarding the characteristics of the geologic materials and contaminants at the proposed test locations. These data will be incorporated into the IM/IRA design as they become available.

Comment 37

The document does not indicate that a soil vapor survey has been conducted at OU2. Such an investigation could be used to delineate vapor concentrations as a function of depth to locate the contaminant source in the subsurface and to aid in designing the soil vapor extraction system.

Response to Comment 37

A soil gas survey has not been conducted at OU2 with the express purpose of identifying the sources of the various dissolved phase plumes. DOE agrees with the commenter in that a soil vapor survey may be useful in identifying potential test sites as well as locating individual vapor extraction wells. For this reason, the IM/IRA proposes a soil gas survey (Page 4-1) to pinpoint the location of vapor extraction wells. However, it is also proposed that a review of Phase II RI data be conducted prior to implementing a soil gas survey. The purpose of the RI data review is to determine if sufficient information exists to place vapor extraction wells without a soil gas survey.

Comment 38

Conceptual hydrogeologic models and cross-sections were created from the geologic logs of boreholes drilled near each of the three test areas. However, the conceptual models do not match the representative geologic logs contained in Appendix D. This mismatch of the subsurface conceptual model to supporting geologic logs is particularly disturbing because DOE has adopted the observational streamlined approach to plan this subsurface IM/IRA for OU2. That is, DOE has acknowledged that the subsurface at OU2 has not

been fully characterized, but intends to use all available data to develop a model of the expected or probable conditions. However, the available data from geologic logs are not consistent with the developed models. Because the extraction systems designed for each area were based on these apparently incorrect conceptual models, there is some concern that the system will not be effective in removing the volatile organic compound (VOC) contamination.

It is suggested that all available data be collected and reanalyzed. New subsurface conceptual models should then be created to accurately reflect the collected data, and all important supporting data should be included in the appendices. Additionally, new figures should be created to accurately illustrate the locations of all boreholes and monitoring wells drilled near the three areas of interest. As currently presented, there does not appear to be enough information to support designing recovery systems at any of three chosen OU2 sites. See specific comments for more detail on the inconsistencies in this report.

Response to Comment 38

The idealized conceptual hydrogeologic models were based on information derived from the logs of many boreholes advanced near each of the proposed test sites. The conceptual models reflect the authors interpretation of the conditions at the proposed test site using data from boreholes advanced at various distances from the actual proposed test location. Rather than present all borehole logs (more than 15) used to develop the conceptual model, one borehole log was presented in the IM/IRA for each proposed test site. In all cases, the log selected for inclusion in the IM/IRA was of a borehole that penetrated to depths in excess of 70 feet to provide an example which illustrated significant hydrogeologic units at the proposed test site. Minor differences between the conceptual models and the boring logs presented in Appendix D were expected and do not reflect an incorrect interpretation of the available data under EPA's Observational/Streamlined Approach methodology. Under this approach, additional site-specific data, such as the results of the Phase II RI, will be evaluated to develop more accurate site specific hydrogeologic models. The updated models will be presented in the vacuum-enhanced vapor extraction Pilot Test Plans. Ultimately, however, the most relevant site-specific data will be gathered during the advancement of boreholes for the installation of the test vacuum extraction wells.

Comment 39

This IM/IRAP identifies Colorado water quality standards as to be considered (TBC) values for discharges of treated ground water. The rationale for considering TBC values for something other than applicable or relevant and appropriate requirements (ARARs) should be provided. Standards have been promulgated by the State of Colorado for both Walnut and Woman Creeks and their tributaries; surface water discharges to either drainage must comply with the standards established for that drainage.

Response to Comment 39

Please see Response to Comment 14.

Comment 40

Page 1-1, Section 3.1. The primary objective of the IM/IRAP is "to provide information that will aid in the selection and design of final remedial actions at OU2 for the removal of free-phase volatile organic compounds (VOC) contamination." Yet, it is known that the site is contaminated with substances other than VOCs, including metals and radionuclides. The primary objective should be restated to include gathering information on remediation of metals and radionuclides.

Rationale: Information should be collected on a technology's effectiveness on all contaminants at OU2, and should not be limited to VOCs.

Response to Comment 40

Based on a review of *in situ* remedial technologies, DOE has determined that *in situ* vacuum-enhanced vapor extraction is ready to be field tested at this time. DOE is of the position that the other candidate *in situ* technologies, such as soil flushing, require further bench scale testing on site-specific soils prior to field pilot testing. The additional testing will provide a better understanding of radionuclide (and metals) mobilization, and allow a pilot system to be designed that has a minimal risk of spreading contamination. As an example, the dynamic steam stripping studies that are being pursued at DOE's Lawrence Livermore National Laboratory (LLNL) (discussed in the Subsurface IM/IRAP/EA, Section 4.1) may provide data that will allow a more informed decision concerning field testing of the technology at the 903 Pad.

The information provided by the Subsurface IM/IRA will specifically be used to evaluated FS alternatives involving *in situ* vacuum-enhanced vapor extraction for removal of dense nonaqueous phase liquids (DNAPLs). This technology addresses removal of VOCs only. The objective of the study is thus limited to examining the performance of *in situ* vacuum-enhanced vapor extraction in removing subsurface VOC contamination.

Comment 41

Page 2-26, Paragraph 2, Section 2.2.5. The text cites DOE's 1980 Environmental Impact Statement (DOE, 1980) for support of a statement that no vegetative stresses attributable to hazardous waste contamination have been identified on RFP. Results of more recent studies should be used to describe current conditions at RFP.

Rationale: A discussion of current biological conditions should be based on relatively recent information. It is not clear that studies leading to the 1980 DOE report were

designed to identify stress from hazardous wastes or were meant to serve another purpose. Recent ecological studies as part of remedial investigations at the site would provide more recent and appropriate information.

Response to Comment 41

It is agreed that more recent studies should be used to describe the current vegetative conditions at RFP. Three documents have been identified that appear relevant to this issue. They are:

- DOE (U.S. Department of Energy) 1991. *Threatened and Endangered Species Evaluation, Rocky Flats Plant Site.* Rocky Flats Plant, Golden, Colorado. Contract No. SBA 65314PB. April 4, 1991.

- DOE (U.S. Department of Energy) 1990. *Wetlands Assessment, Rocky Flats Plant Site.* Rocky Flats Plant, Golden, Colorado. Contract No. SBA 53572PB. April 30, 1990.

- USDA (U.S. Department of Agriculture) 1983. *Soil Survey of Golden Area, Colorado.* Soil Conservation Service, U.S. Government Printing Office: 1983—167-S/304.

Review of these documents indicates that they do not specifically address the question of vegetative stress at RFP due to hazardous waste. However, any available data collected during the Phase II OU2 RI that addresses the issue of vegetative stress will be incorporated into the final IM/IRAP/EA.

Comment 42

Page 2-27, Paragraph 1, Section 2.2.5. The text describes common birds of prey in the area based on the 1980 DOE environmental impact statement (DOE, 1980). Many of these species are no longer considered common. The text should be revised based on relevant, recent data.

Rationale: Again, the use of 12-year-old data is inappropriate to describe current ecological conditions. In this case, particularly, ferruginous and Swainson's hawks are no longer considered common.

Response to Comment 42

The first reference cited in the Response to Comment 41 will be used as the primary source of information regarding threatened and endangered species at RFP. This 1991 reference indicates that the ferruginous hawk (*Buteo regalis*) is considered to be endangered and is classified as a Federal Category 2 wildlife species. The text will be modified to reflect this fact.

Comment 43

Page 2-29, Paragraph 2, Section 2.2.7. The list of Clean Water Act provisions identified for protection of wetlands is not complete. The list should either be complete or refer only to the act generally.

Rationale: The identification of only a partial list of applicable laws as the controllers of relevant issues may lead to an incomplete evaluation of the resource.

Response to Comment 43

The text refers specifically to Sections 401 and 402 of the Clean Water Act, which are the primary sections of relevance. However, Section 404 is also of significance to wetlands protection, and Sections 101, 102, 201, 301, 302 and others can be interpreted to be of significance as well. Therefore, the text will be revised to address the Clean Water Act in its entirety in order to avoid misunderstanding.

Comment 44

Page 4-5, Section 4.1. The discussion on the possible use of in situ bioremediation considers only the remediations of halogenated organic compounds. DOE should address the effect of radionuclides on microorganisms.

Rationale: All factors that may affect the effectiveness of a remedial technology should be discussed in the evaluation.

Response to Comment 44

The technology review presented in Section 4.1 is intended to provide the reader with some of the background information leading to selection of *in situ* vacuum-enhanced vapor extraction for the Subsurface IM/IRA. This review does not constitute complete technology evaluations, but identification of applicability for *in situ* cleanup at OU2. Since bioremediation was identified as inappropriate for cleanup of halogenated DNAPL, it is not necessary to examine other aspects of the technology, such as the effect of radionuclides on the microorganisms. If more than one technology was identified to be applicable for *in situ* pilot testing at OU2 at this time, complete analyses would have been provided (i.e., effectiveness, implementability, and cost) to select the preferred IM/IRA alternative.

Comment 45

Page 4-10, Section 4.2.3.1. This section discusses the off-gas treatment for the vapor stream collected from the vapor extraction system. High-efficiency particulate air (HEPA) filters and a granular activated carbon (GAC) adsorption unit will treat the

vapor stream. However, the effect of the HEPA filters on VOC contaminants in the vapor is unknown. DOE should discuss any problems related to using HEPA filters on VOCs.

Rationale: The off-gas treatment system should be thoroughly evaluated for possible problems.

Response to Comment 45

The HEPA filters are included in the conceptual design of the offgas treatment system for removal of any entrained particulates. The HEPA filters will not remove VOCs from the vapor stream. Even in the event that a VOC-contaminated particulate is trapped in the filter, the VOCs will quickly volatilize from the particulate and continue downstream to the GAC units.

Accumulation of moisture in the HEPA filters is a potential operating problem. However, any entrained liquids will be removed by a mist eliminator prior to filtration (Figure 4-6). Also, the heat imparted to the air stream by the vacuum pump will raise the temperature of the vapor stream well above its dew point, thus preventing condensation in the HEPA filters.

Comment 46

Page 4-10, Paragraph 3, Section 4.2.3.1. The text states that greater than expected air releases will be controlled by the project-specific health and safety plan and the plan for prevention of contaminant dispersion. The ways these documents would control a release is not clear. Identification of a greater than expected release will most likely be after the fact. The IM/IRAP should explain how the plans will control air releases.

Rationale: The plan does not distinguish between control of the release and control of the effect of the release.

Response to Comment 46

The project-specific health and safety plan will require employees to wear personal protection equipment (PPE) including respirators, gloves, and protective clothing during work tasks where contaminant releases are likely. This will prevent employee exposure in the event of an unplanned release. Employees who are unprotected at the time of an unexpected release will be alerted to take immediate evasive/protective action by warning alarms on direct reading analytical equipment.

If routine air monitoring of dust emissions from planned activities reveals higher than expected dust concentrations, the implementation of dust control techniques described in the PPCD will be initiated. These techniques may include such measures as soil wetting with water or a water-surfactant mixture, windscreen deployment, a change in drilling techniques, application of surfactants to unpaved roads, restrictions on vehicular traffic, temporary stoppage of project operations due to high winds, etc. The PPCD describes a staged approach to preventive measures assessment.

The text of the final Subsurface IM/IRAP/EA will be modified to clarify this approach.

Comment 47

Page 4-15, Paragraph 1, Section 4.2.3.4. The statement that further consideration of impacts to threatened and endangered species for the OU2 IM/IRAP is not warranted does not agree with the statement on page 2-28 that focused surveys of potentially suitable habitat will be undertaken to determine whether sensitive wildlife species are present. The text should be clarified. Because there appears to be some question whether all habitat for sensitive or special status species has been evaluated, the assertion that further efforts are not warranted should be eliminated.

Rationale: One of the major ecological issues associated with the site is its possible use by special status species. The assertion of inadequate information in one section of the IM/IRAP does not correlate with the determination that no further consideration is warranted in another section of the IM/IRAP.

Response to Comment 47

The DOE will conduct a survey to determine the presence or absence of a federally listed plant, the diluvium ladies' tresses (Spiranthes diluvialis), in areas to be disturbed by construction activities at RFP. The survey will be conducted during August 1992, with each project site being investigated on two different occasions (a minimum of 14 days must elapse before performing the second investigation). If the plant is located at the proposed location of the OU2 IM/IRAP treatment and/or extraction facilities, the facilities will be relocated, to the extent possible, to a site that will not adversely impact the plant or its critical habitat. If facilities cannot be relocated, Section 7 consultation will be initiated with the U.S. Fish and Wildlife Service to determine mitigation.

Comment 48

Page 4-24, Section 4.3.1.1, Figure 4-1. The text and the figure state that the proposed testing site is in the north-central portion of the spill area. A rationale should be provided for this proposed test area as a more suitable area would seem to be center of the spill area illustrated in Figure 4-1.

Rationale: The area of proposed testing should be justified.

Response to Comment 48

The relevant paragraph refers to the north central portion of the Individual Hazardous Substance Site (IHSS) (903 Pad) and not the north central portion of the stained area. The language in question was intended to inform the reader that the proposed test location was the large stained

area shown on Figure 4-1 in the north central portion of the 903 Pad. This issue will be clarified in the final version of the IM/IRAP/EA. However, it is worth noting that additional information such as the results of the Phase II RI and possibly a soil gas survey will be used to select the actual test location.

Comment 49

Page 4-24, Section 4.3.1.2, and Appendix D. This section states that borehole (BH) 1687, which was used to represent the stratigraphy of the 903 Pad, is shown on Figure 2-9. BH1687 is not illustrated on this figure. In addition, this section describes the stratigraphy of the area based on the log of BH1687. However, the written description and the log of the borehole do not match. The text states that the alluvium extends to 18 feet below ground surface (bgs), whereas the log illustrates alluvium to 22 feet bgs. It should also be noted that the log indicates that no sample was recovered from the interval 11 to 20 feet. The text should be corrected to accurately reflect the geologic log. In addition, Figures 4-2 and 4-4 should also be corrected to reflect the correct depth to bedrock (22 feet) at the 903 Pad area.

Rationale: The text should accurately reflect the subsurface geology described on the geologic logs.

Response to Comment 49

We acknowledge that Figure 2-9 does not show the location of borehole 1687; this is an error. The final version will incorporate a narrative description of the location of this boring with respect to the 903 Pad.

The reader is referred to the Response to Comment 47 for a discussion of the relationship between boring logs presented in Appendix D and the conceptual hydrogeologic models.

Comment 50

Page 4-32, First Paragraph, Third Sentence. This sentence describes the installation of a steel surface casing to bedrock in deep vapor extraction wells, while Figure 4-5 illustrates polyvinyl chloride (PVC) casing. The type of casing illustrated in the figure should be the same as the type of casing described in the text. This discrepancy should be corrected.

Rationale: Consistency among the text and supporting figures promotes clarity.

Response to Comment 50

It is important to note that detailed extraction well design and construction specifications will be specified in the site-specific Test Plans. The level of detail presented in the IM/IRAP/EA to describe the extraction wells was, perhaps, too specific for conceptual planning purposes.

In any event, the inconsistency identified in the comment should be resolved with the following additional information. Steel would be selected to permit the casing to be spudded (driven by free fall) into the bedrock to ensure a good seal. As a cost-saving measure, however, the screen and casing material used for shallow wells will be PVC. In addition, the screen and riser pipe (internal casing) for the deep wells will also be PVC. This description is consistent with the figure and text.

Comment 51

Page 4-40, Section 4.3.2.1. This section discusses the use of a heated holding tank for storage of 903 Pad ground water and condensate. The text does not mention the requirement for secondary containment of this holding tank for potentially hazardous waste. The text should discuss the secondary containment requirements for this holding tank and explain how they will be met.

Rationale: The Resource Conservation and Recovery Act (RCRA) requires secondary containment for hazardous waste tank storage units.

Response to Comment 51

Secondary containment will be provided for the ground-water storage tank as required by 40 CFR 264.193(d) [6 CCR Section 264.193(d)]. As discussed in Response to Comment 50, detailed design specifications of the elements of the vacuum-enhanced vapor extraction systems will be provided in the site-specific Test Plans. This will include the details of the tank design and associated secondary containment structure.

Comment 52

Page 4-45, Section 4.3.3.2. Vacuum extraction has demonstrated effectiveness on soils with permeabilities of 10^{-4} to 10^{-6} centimeters per second. This section of the report does not provide values for permeabilities of the soils at OU2. This information can be found in documents such as "Hydrogeological Characterizations of the Rocky Flats Plant" (Hydro-Search, 1985). The report should contain permeability values to demonstrate the feasibility of vacuum extraction.

Rationale: The viability of a potential remedial technology should be justified with quantifiable parameters.

Response to Comment 52

The commenter notes that "vacuum extraction has demonstrated effectiveness on soils with permeabilities of 10^{-4} to 10^{-6} centimeters per second (cm/sec)." This range of permeabilities is typical of silt or silty clay (Freeze and Cherry, 1979. Groundwater, Prentice-Hall, Inc., Englewood Cliffs, NJ, 604 p). This technology has also been demonstrated to be effective for soils with higher permeabilities and in some cases, for clayey soils with slightly lower permeability. The geologic materials that will be subjected to vapor extraction efforts include unconsolidated alluvium consisting of sand and gravel with some silt and clay, and sandstone and claystone bedrock.

Hydraulic conductivities of saturated geologic materials are presented in the Phase II RFI/RI Work Plan (DOE, 1991. Phase II RFI/RIFS Work Plan [Alluvial], 903 Pad, Mound, and East Trenches Areas [Operable Unit No. 2], Rocky Flats Plant). Conductivity values for alluvium were derived from pumping tests and slug tests performed during the initial site characterization (1986) and during the Phase I RI (1987). For alluvial material (Rocky Flats Alluvium), a mean hydraulic conductivity value of 4×10^{-4} cm/sec was reported for the 903 Pad, Mound and East Trenches. Hydraulic conductivity values for sandstone and claystone bedrock were derived from packer tests conducted during the Phase I RI. These values ranged from 1×10^{-8} to 1×10^{-6} cm/sec; however, slug tests conducted on the sandstone indicated higher conductivities on the order of 5×10^{-5} to 1×10^{-3} cm/sec.

Hydraulic conductivities presented above reflect physical properties of the saturated portion of subsurface materials. The proposed vacuum-enhanced vapor extraction pilot test will be conducted on the unsaturated alluvium as well as de-watered bedrock. Additional aquifer tests were conducted as part of the Phase II RI and the results will be reviewed with respect to predicting performance of the proposed pilot tests.

Comment 53

Page 4-45, Section 4.3.3.2, Seventh Sentence. According to this sentence, "Both sandstone and claystone bedrock is expected to have relatively low permeabilities when compared with the alluvium; however, bedrock permeability is expected to be high enough to permit a measurable vapor flow rate." This statement does not indicate whether a measurable air flow rate is sufficient to support the flow required by a vacuum vapor extraction system. The permeability of the sandstone and claystone should be defined more exactly and the text should be modified to describe the specific requirements of the vacuum vapor extraction system.

Rationale: Presentation of complete environmental data promotes effective evaluation of technologies and prevents unnecessary expense and use of resources.

Response to Comment 53

The permeability of geologic materials to air will vary laterally and vertically within a given geologic unit. Accurate quantitative statements regarding physical properties of geologic materials at the proposed test locations are not possible at this time. The proposed Subsurface IM/IRAP/EA includes qualitative statements regarding expected conditions based on available geologic data for areas near the proposed test sites (little or no data is currently available on the physical properties of the material underlying the actual IHSSs). Based on aquifer test data and geologic logs, it is reasonable to assume that conductivities of the alluvium will be higher than for bedrock materials. It is also assumed that given sufficient vacuum applied to claystone bedrock containing interconnected fractures, a measurable vapor flow rate can be induced. The purpose of the pilot test is to confirm or refute this hypothesis.

The commenter asks "whether a measurable flow is sufficient to support the flow required by a vacuum-enhanced vapor extraction system." There is no "minimum" flow rate required to support a vapor extraction system. The combination of flow rate and contaminant concentration in recovered vapor will provide a contaminant recovery rate (i.e., mass per unit time). Success criteria are essentially based on a comparison of the recovery rate per unit cost for vapor extraction vs. alternative remediation methods such as excavation and disposal or treatment.

Comment 54

Page 4-51, Section 4.4.1.2, and Figure 2-9. Borehole 2087 is not illustrated on Figure 2-9, as stated in this section. BH2087 should be added to Figure 2-9.

Rationale: The text and figures should be consistent.

Response to Comment 54

We acknowledge that borehole 2087 is not shown on Figure 2-15; this is an error. The final version of the IM/IRAP/EA will provide a narrative description of the location of borehole 2087 relative to the Mound IHSS No. 113.

Comment 55

Page 4-52, Section 4.4.1.2, Second Paragraph. According to this paragraph, the sample from well 0174 collected in 1987 had a perchloroethylene (PCE) concentration greater than the solubility limit. Concentrations of PCE in other samples collected from this well exceed 5 percent to 10 percent of the solubility limit. These levels of DNAPL constituents can indicate the presence of an immiscible phase. Before implementing vacuum vapor extraction, the ground water in the area of well 0174 should be evaluated to determine whether there is an immiscible phase, using an interface probe or a bottom-loading clear teflon bailer.

Rationale: Complete evaluation of existing data and further investigation in areas of concern promotes the effective evaluation of treatment technologies.

Response to Comment 55

Sampling of monitoring well 0174 has been recommended and will likely be implemented using an interface probe, double check valve bailer or thief sampler. This issue was not addressed in the IM/IRA and will probably be conducted under the existing Phase II RI Work Plan.

Comment 56

Page 4-61, Section 4.5.1.2, First Paragraph. This paragraph states that two boreholes (which were converted to monitoring wells) BH3587 and BH3687, were drilled north of the East Trenches Area, as shown on Figure 2-13. However, only BH3587 is illustrated on Figure 2-13. In addition, Figure 2-9 illustrates BH3587 and BH3687 in the Mound Area rather than north of the East Trenches Area. The text and figures should be revised to correctly depict the location of boreholes and monitoring wells drilled in the OU2 area.

Rationale: The tables and text should be consistent and accurate.

Response to Comment 56

The paragraph in question states that monitoring wells 3587 and 36897 shown on Figures 2-13 and 2-15, respectively. There appears to be no error or inconsistency between the text and figures. However, the commenter is correct in noting that a boring at Mound is also numbered 3687. To our knowledge, this boring was not completed as a monitoring well, thus providing a means for discriminating between two data points with the same identification number.

Comment 57

Page 4-61, Section 4.5.1.2, Second Paragraph, and Appendix D. The description of the log for BH3687 on page 4-61 does not match the log presented in Appendix D. The text states that the alluvium extends to approximately 11 feet bgs, whereas the log illustrates alluvium to approximately 7.5 feet bgs. In addition, the text describes an 11-foot interval of sandy claystone underlying the alluvium, whereas the log describes this layer of claystone as silty with caliche. Lastly, the text states that sandstone underlies the claystone and extends to a depth of at least 75 feet bgs, whereas the log illustrates that the sandstone extends to a depth of only 45 feet bgs. The text should be modified to correctly represent the attached borehole log.

The last sentence of this paragraph states that claystone underlies the alluvium south of the East Trenches and that sandstone underlies the alluvium west of the East Trenches. Because only one geologic log of the East Trenches Area was provided, there is no way to determine the validity of this statement. Additional geologic logs should be provided for review.

Rationale: The geologic log should support the description of the subsurface geology in the East Trenches Area.

Response to Comment 57

The boring log presented in the proposed Subsurface IM/IRAP/EA differs from the version used to develop the conceptual model. An original hand-written log was used because it contained more detail than subsequent published versions. Apparently, the final version (presented in Appendix D of the IM/IRA) was revised based on re-examination of the core and is at this time considered the correct version. Therefore, the commenters' concerns are well taken and, in this case, there are significant differences between the conceptual model and the log of the boring for monitoring well 3687. It is important to note that monitoring well 3687 is at least 50 feet north to of the proposed test location and the text describes considerable variation in the geology around the proposed test site (based on logs of other boreholes near the test site).

A review of draft logs of borings recently advanced as part of the OU2 Phase II RI (two of which were advanced directly through the proposed test site) described the following geology from the surface downward:

- Sandy gravel alluvium to a depth of between 17 and 21 feet.
- Sandy siltstone bedrock ranging from 2 to 8 feet thick directly underlying the alluvium.
- Silty sandstone underlying the sandy siltstone.

The silty sandstone interval reportedly extends to a depth of approximately 50 feet under the proposed test site and contains interbeds of claystone.

The conceptual model presented in Figure 4-10 describes alluvium underlain by water-bearing sandstone with fine-grained interbeds. Based on the recent Phase II data, this model remains correct with respect to stratigraphy. However, the elevations of geologic contacts are probably not correct in light of the new data because the idealized conceptual models are subject to change based on forthcoming data; the authors believe they remain reasonably accurate and are suitable for the final document.

COMMENTER: ENVIRONMENTAL INFORMATION NETWORK (EIN), INC.

Comment 58

Comments have been submitted previously by Paula Elofson-Gardine for the Rocky Flats Cleanup Commission in recent years regarding Treatability Studies for the 903 seepage problems and 903 Preliminary IM/IRA. The concerns expressed in those communiques remain regarding lack of interception and remediative effort toward mitigating the surface water seeps and migrating americium spike located downgradient to the east from the 903 Pad. The concentrations indicated in the aerial gamma survey are underscored by the in situ readings from the mobile high-purity germanium detector which supplemented this study. It is imperative that subterranean, 3-dimensional, isotope-specific plumage footprint be generated to characterize the extent of contamination and migration in the environment by the different isotopes in the area. A similar analysis should be conducted regarding chemical contaminants.

Response to Comment 58

With respect to interception of the seeps, a risk assessment was performed that indicated that the seeps pose a low risk to human health. Based on this assessment, DOE, EPA, and CDH agreed to conduct the Subsurface IM/IRA in lieu of the Woman Creek Basin IM/IRA. Please see Response to Comment 27 for additional details. Also note that the draft Woman Creek Basin IM/IRAP/EA is available for your review in the public reading rooms. This document contains the detailed risk assessment.

The OU2 Phase II RFI/RI is intended to be the final site characterization effort that will address the nature and extent of contamination at OU2. This includes assessment of the vertical and areal extent of radionuclide and chemical contamination emanating from the 903 Pad, Mound and East Trenches Areas. This document will form the basis for evaluating risks to the public health and the environment, and formulating remedial alternatives that address risk reduction.

Comment 59

Numerous discussions were held with Dr. Ed Martell, radiobiophysicist at National Center for Atmospheric Research (NCAR), who was one of the original independent scientists that surveyed plutonium and americium contamination in the area. Dr. Martell expressed concern regarding cesium hot spots in the area in addition to the increasing ingrowth of americium flowing from the 903 Pad. He theorized that some areas of plutonium contamination may have been subject to "micro-fissioning" in the environment due to exposure to moisture and the weathering process. Without a complete characterization of potential problems such as this, how can DOE or EG&G undertake mitigating or remediative efforts?

Response to Comment 59

Radiological surveys conducted by EG&G in 1990 and 1991 detected above background plutonium and americium activities in the soils within OU2, particularly in the 903 Pad Area. The data did not indicate any americium enrichment relative to the natural ingrowth of americium from normal plutonium radioactive decay. It was also concluded from the radiological survey that the cesium-137 activity was consistent with global fallout levels. Furthermore, an Independent Criticality Safety Assessment Team concluded in a report released in 1989 that there has not been a criticality at RFP. There conclusions were based on a review of radioactive cesium and strontium levels in soil and water, records of past operations, criticality procedural infractions, plant renovations, fires and radioactive exposures. Therefore, it may be that Dr. Martell's concerns and theories are based on old, and possibly unfounded information.

All data available from the OU2 Phase II RFI/RI will be used to select and characterize the sites for conducting the pilot tests. Preventing uncontrolled mobilization of radionuclides and avoiding radiological hazards are paramount safety objectives for the conduct of the pilot tests.

Comment 60

> *Considering the above [Comment 59], the concern regarding the steam stripping approach being utilized in areas under the Pad that has significant deposits of plutonium present. Has there been evaluation of the synergistic effect of all contaminants (Pu, Am, Cs, U, etc.) with respect to any disruptive remediative action, specifically with respect to the use of steam stripping?*

Response to Comment 60

The concentrations of the radionuclides in the subsurface are too low for there to be any chemical influence of one radionuclide on another with respect to mobility during steam stripping, nor is it expected that there would be a unique radiological hazard presented simply due to the mix of radionuclides present beneath the 903 Pad. Regardless, if steam stripping is pursued, calculations will be performed to conservatively estimate the concentrations of radionuclides in extracted ground water/condensate. This information will be reviewed along with waste management practices by EG&G's Health and Safety Department.

Comment 61

> *EIN is concerned about hazards of vaporized or volatilized contaminants including radionuclides for workers involved with this project. Will these individuals have appropriate respiratory protection and bioassay? The Directors of EIN have expressed many times in recent years concern regarding containment buildings being utilized at each cleanup site as remediative effort progresses to mitigate releases to the environment.*

Temporary containment buildings such as this are described in industry journals such as HAZMAT magazine and are not prohibitively expensive. Please specify what protective measures are to be used. Please specify what type of off-gas monitoring will be occurring to monitor volatized VOC's and radionuclides.

Response to Comment 61

The DOE is committed to using all appropriate measures to control, assess, and mitigate dust entrainment into the atmosphere during construction of the Surface Water IM/IRA. To ensure protection of worker and public health, all IM/IRA construction activities will be performed according to procedures set forth in a Project-Specific Health and Safety Plan (PSHSP). PSHSP procedures will be based on the most applicable dust control, assessment, and mitigation techniques available. The procedures presented in PSHSP are specific to IM/IRA construction and operating activities. The PSHSP will, therefore, be completed after the IM/IRA design is finalized, at which time it will be made available to the public and discussed at DOE Quarterly meetings.

It is expected that the PSHSP will include specific employee monitoring procedures for VOCs and radionuclides. Due to site controls, it is not expected that employees will be subject to significant exposures to VOCs or radionuclides. Therefore, personal respiratory protection and bioassay of employees assigned to the project may not be necessary. If the final IM/IRA design suggests there is a potential for employee exposure and/or employee monitoring indicates potentially significant exposure, then respiratory protection and/or bioassay procedures will be required.

Comment 62

Please specify the expected phase changes and temperature ranges with respect to the in situ vacuum-enhanced vapor extraction process. Have all volatile, semi-volatile, and non-volatile organics been characterized to indicate phase change characteristics, boiling point, and volatilization parameters for successful steam application? What efficiency ratings are projected for removal of contaminants? It would be useful to provide a side-by-side comparative table with the above information.

Response to Comment 62

Vapor extraction technology involves changing the state of an organic contaminant from liquid to vapor. The contaminant-carrying gas is then removed from the subsurface and treated. Standard vapor extraction systems operate at subsurface ambient temperatures, 50-60°F. Thermally-enhanced vapor extraction (i.e., heated air or steam injection) operates at greater than ambient temperatures. The actual operating temperature depends on many factors including the temperature and flow rate of the injected stream, subsurface geology (e.g., porosity, heterogeneity), areal influence, and mode of operation (i.e., pulsed versus continuous air flow).

The primary property influencing the volatilization behavior of a compound is vapor pressure. In practice, however, the boiling point of the contaminant is typically used to assess the potential applicability of vapor extraction technology. (The vapor pressure and boiling point of a contaminant are related. A compound with relatively high vapor pressure boils at a relatively low temperature.) The boiling points of the three primary solvent contaminants that are expected to be present at the OU2 pilot test sites are listed below:

Contaminant	Boiling Point (°C)
Carbon Tetrachloride	77
TCE	87
PCE	121

In situ vacuum-enhanced vapor extraction technology has been shown to be effective in recovering organic contaminants with boiling points up to 150 to 160°C.

The effectiveness of vapor extraction technology will be determined by the pilot tests. Estimates of contaminant removal efficiencies are speculative without knowledge of the exact extent and nature of the free-phase VOC contamination and geology at the test sites. Moreover, performance factors, such as contaminant mass removal rate and mass removal per unit cost, are better suited than removal efficiencies to assess the effectiveness of *in situ* vacuum-enhanced vapor extraction as discussed in the Subsurface IM/IRAP/EA (Section 4.3.2).

Comment 63

Regarding application of Applicable or Relevant and Appropriate Requirements (ARAR) without considering the synergistic effect of all contaminants and radionuclides, EIN requests that this issue be addressed.

Response to Comment 63

The synergistic or additive toxicological effects of contaminants is always considered in the conduct of risk assessments. Such risk assessments are performed to establish the need for site remediation, and to determine if the proposed remedial alternatives achieve adequate protection of human health and the environment. The NCP requires that final remedial actions attain ARARs (unless one of six waivers is invoked). Attaining ARARs is a NCP "threshold requirement" for final remediation as is achieving adequate protectiveness. The risk assessment may indicate that attaining ARARs is not sufficiently protective and remediation levels may require some downward adjustment. However, for an IM/IRA, the IAG states that it is only necessary to attain ARARs to the extent practicable, and the NCP notes that ARARs can be waived if the action is to become part of the final action. Because the IM/IRA is only part of the final remedy and is expected to attain ARARs, the interim action is considered sufficiently protective at this time. The additive or synergistic effects of contaminants will be considered in setting the final remediation goals for OU2.

Comment 64

If this is initiating a pilot program or test program for assessing applicability of LLNL's methodologies for in situ cleanup, EIN would like a copy of initial results from the study of site specific applicability and efficiency. Experimental technologies that are planned for application at the RFP should be thoroughly discussed within the scientific and public communities. Background materials and results from other site specific studies planned for application at the RFP should be provided for interested party review. EIN would like copies of these materials.

Response to Comment 64

Test plans and significant treatability testing results relevant to the subsurface IM/IRA project will be made available to the TRG and will also be discussed at the DOE quarterly meetings. Technologies not relevant to the IM/IRA will be evaluated under site-wide and OU-specific treatability study programs. Final reports on these studies that are submitted to EPA and CDH will become part of the public domain and would be available for public review.

Comment 65

The ability to apply the above technology to the broad area comprising the 5 sites: 903 Drum storage Site, 903 Lip Site, Trench T-2 Site, Reactive Metal Destruction Site, Gas Detoxification Site is questionable. Soil removed from the 903 Lip Area was packaged and shipped to INEL. This soil should be analyzed for radionuclide and chemical contaminants so that this database can be utilized in assessing similar materials and/or by-products that may be present in the areas of remediation.

Response to Comment 65

The site for demonstrating the steam stripping technology has not been selected yet. Chemical and radiological characteristics of the sites relevant to the performance and safe testing of the technology will be important factors in site selection. Site characterization will be based on the results of the OU2 Phase II RFI/RI. The data will include a comprehensive chemical characterization of wastes, soils and ground water present in the 903 Pad Area. It should also be noted that soils removed from the 903 Pad Area and shipped to INEL were subsequently buried and therefore are unavailable for further analysis.

Comment 66

Has there been consideration given to the possibility of caustic or acidic by-products and reactions connected with the reactive metal destruction site with respect to steam stripping? If so, are there trapping parameters planned with sufficient ongoing sampling and monitoring in place? EIN suggests that the steam stripping technology may be useful only in confined areas, not for use in broad, unconfined areas. Where does the 25,000

kilograms of uranium in Trench T-1 fit into this process? It is EIN's opinion that these areas should be subject to "hog and haul" removal of contaminants, not steam stripping.

Response to Comment 66

We agree that excavation and off-site disposal of depleted uranium chips may be the preferred remedial alternative that partially addresses source removal at Trench T-1. Please see response to Comment 65 concerning site selection.

Comment 67

A transmigration study was done by Los Alamos approximately 2 years ago that indicated plutonium contamination to migrate from 20 feet up to 2 miles from point of origin with respect to ground water contamination. Have other source points in the 900 Compound such as Building 998 been evaluated as contributing sources toward this remediative process?

Response to Comment 67

Determining other sources of plutonium for contamination at the OU2 is beyond the scope of this IM/IRA. Sources and the nature and extent of contamination are the subjects of the RFI/RIs being conducted at RFP. Additionally, the USGS, under an Interagency Agreement with DOE, is investigating the possible migration of plutonium and americium via seeps and groundwater and the chemical/speciation of plutonium and americium in Rocky Flats waters. An objective of the IM/IRA, with respect to steam stripping, is to assess its effectiveness in removal of plutonium at the 903 Pad which is a confirmed source for this radionuclide.

Comment 68

The concentrations cited in Section 2.3.2.2 regarding inorganic contamination is not consistent with those readings seen in other reports or revealed in discussions with Dr. Ed Martell, among others.

Response to Comment 68

The Subsurface IM/IRAP contains information considered to be current at the time of preparation, whereas the other reports described by the commenter may not be current. The commenter does not cite specific publications, therefore, it is difficult to make comparisons with the data presented in the IM/IRAP.

Comment 69

Will there be independent oversight and split sampling with the CDH and/or EPA for quality assurance?

Response to Comment 69

All sampling and analysis conducted on this project will comply with the Quality Assurance Project Plan (QAPjP). Also, under the IAG, EPA and CDH have the option to have sample splits taken at any time.

Comment 70

There have been numerous public comment testimonies submitted by various organizations focused on the RFP issue. These testimonies such as that for the 881 Hillside IM/IRA, Plan for Prevention of Contaminant Dispersal (dust control problems), 903 Treatability Studies/903 Seepage Problems, PEIS, among others, should be utilized to identify relevant comments and suggestions as the 881 Hillside and 903 connected remediation areas encroach upon each other.

Response to Comment 70

DOE has been responsive to all comments provided on the above cited programs. In fact, comments provided on one program have shaped other related programs, eg., comments on dust generation during construction of the 881 Hillside Area IM/IRA were carefully considered in preparing the PPCD. The Subsurface IM/IRA is no exception, and all relevant comments on related programs have been considered in preparing the IRAP.

COMMENTER: ROCKY FLATS CLEANUP COMMISSION

Comment 71

The Cleanup Commission was surprised to learn in this Subsurface IM/IRAP/EA that a draft Woman Creek Basin Surface Water IM/IRAP/EA was submitted to the EPA and CDH, and that a preference for a No Action Alternative was made because "results of the evaluation indicated that the contaminated seeps present no immediate threat to public health or the environment" (page 1-6). This information comes as a surprise, indicating that a greater effort on the part of the DOE and the regulators could have been made to inform and involve the public in this decision-making process. Where is the information that indicates that the seeps present no immediate health threat? This information should have been incorporated into this IM/IRA in order to better justify the replacement of the Woman Creek Basin Surface Water Interim Measure with this Subsurface IM.

Response to Comment 71

Please see Response to Comments 1 and 27.

Comment 72

On page 3-4, in the discussion on the selection of ARARs for this interim measure, the following quote is found: "As discussed in 55 FR 8741 (Preamble to the NCP), when more than one ARAR exists for a contaminant, the most stringent standard has been identified as the ARAR. This IM/IRA will attain the most stringent ARAR to the greatest extent practicable." Judging by what is presented in this interim measure plan, however, the authors should have added a qualifier. "The most stringent standard shall be applied as long as it is acceptable to the DOE, and, if not, the DOE reserves the right to define whatever it feels is appropriate." This attitude is readily apparent in DOE's refusal to accept the Colorado Water Quality Control Commission's Segment-Specific Surface Water Standards for Rocky Flats as the applicable standards for water quality in this interim measure.

As presented, DOE favors the state-wide standards over the segment-specific standards because the latter are "not of general applicability and not enforceable through the NPDES permitting process." It is more likely that a plutonium standard of 15 pCi/ℓ, as found in the state-wide standards, is more acceptable to the DOE than 0.05 pCi/ℓ, as found in the site specific standards. According to the letter from the Colorado Department of Health found in the Executive Summary of this document, the Colorado Attorney General has indeed affirmed the applicability and enforceability of the site-specific standards for Rocky Flats. The DOE risks losing its nascent credibility and returning to its Cold War attitude if it continues this policy of self-service standards selection. DOE's acceptance of whatever standards the people of Colorado have set, through their representatives on the Water Quality Control Commission, is mandatory.

Response to Comment 72

DOE shares a common goal with EPA, CDH, and the public, i.e., to clean up RFP to a level that is protective of human health and the environment consistent with the future use of the site. The cleanup levels that provide this protectiveness have not been determined as yet. Attaining ARARs is also a "threshold requirement" for final site remediation (see response to Comment 63). In this IRAP, DOE has presented well founded legal arguments that question the validity of some CDH water quality standards being considered ARARs. DOE's concern is that these standards may be unduly restrictive, surpassing cleanup levels considered protective. At this stage, DOE simply wishes to avoid setting precedents that will be difficult to "undo" in the future, even if all parties agree to the changes. Nevertheless, as discussed in Response to Comment 14, DOE is committed to resolving all ARAR issues with the regulatory agencies in the near future. To conclude, we wish to assure you that our position is not self serving and that we have no interest in returning to a "Cold War" attitude.

Comment 73

> *Originally, interim measures were described as being necessary for the prevention and remediation of immediate threats to the public's health or environment. This was true for the installation of the French Drain at OU1 and the Seep Collection and Treatment Unit for the Walnut Creek Basin. Then, the IM/IRA for OU4 came out, but the public was cautioned not to confuse it with the IAG IM/IRA for the OU4, and that it was being implemented as an "enabling activity to facilitate pondcrete operations and site closure." Now, this Subsurface IM/IRAP/EA is released, having added a "P" after the "IRA", and also an "EA" at the end. A new justification was added about how an interim measure can be implemented in order to "gain site-specific remedial information to support final action." It appears then, that many different criteria can be called upon, depending on the situation, to define an interim measure. Where is the consistency?*

Response to Comment 73

All remedial activities at RFP conducted prior to a final action are considered IM/IRAs. At OU 4, it was realized after the IAG was approved, that pondcrete operations are a remedial activity, and therefore, it is necessarily an IM/IRA. (As the commenter points out, this IM/IRA is not the one identified in the IAG, the latter being a Phase I remedial action to remove contaminant sources remaining after pond sludge and materials have been removed.) As required by the general provisions of the IAG, an OU 4 IM/IRA Plan was submitted for the pondcrete operations (IM/IRA Plan has been shortened to IM/IRAP). In accordance with NEPA, DOE has determined that an Environmental Assessment (EA) is required for IM/IRAs. For OU 1, the EA was a separate document. Subsequent IM/IRAPs included the EA, thus the acronym IM/IRAP/EA. Lastly, the primary motive for conducting an IM/IRA is to address an immediate threat to public health and the environment. Recent guidance contained in an EPA OSWER Directive indicates that IM/IRAs also may be conducted to gain site-specific remedial information to support final remediation. This is the regulatory rationale for labeling the proposed subsurface pilot tests an IM/IRA. However, more fundamentally, the pilot tests fulfill DOE's commitment to perform an interim remedial action (aside from the South Walnut Creek

IM/IRA) at OU2 in light of the inappropriateness of conducting the Woman Creek Basin IM/IRA. Please see Response to Comment 27 for further details on this matter.

Comment 74

It also is interesting how CERCLA criteria can be used or dismissed within the conduct of an interim measure. For example, page 4-8 presents information as follows: "Effectiveness evaluation of the proposed subsurface IRAs does not include several of the CERCLA effectiveness criteria due to the nature of the IM/IRA. These criteria include threat reduction and length of time until protection is achieved." If certain criteria can be dismissed or do not apply, then do you truly have an interim measure?

Response to Comment 74

The CERCLA criteria presented in the March 1990 NCP and in Section 4.2 of the Subsurface IM/IRAP/EA were developed to provide guidance for evaluating remedial alternatives. These criteria were used in the Subsurface IM/IRAP/EA, where applicable to the proposed IRAs, to provide a better understanding of the expected effectiveness and implementability of *in situ* vacuum-enhanced vapor extraction technology.

The CERCLA evaluation criteria noted above do not define the need for conduct of an IM/IRA. Usually, the need to conduct an IM/IRA is based on the existence of an immediate or imminent threat to public health or the environment. Although such a situation does not exist at OU2, there is reason to pursue the Subsurface IM/IRA to gain site-specific remedial information that may aid in the design and implementation of final cleanup efforts. Such justification is presented in the EPA OSWER guidance referenced in Section 1 of the Subsurface IM/IRA. Thus, the proposed Subsurface IM/IRA is unique in that it makes a distinction between the use of an IM/IRA as a vehicle for contaminant migration abatement/risk reduction and site-specific data collection in support of final cleanup.

Comment 75

While not opposing the necessity or the benefit of the activities which are currently being proposed as interim measures at Rocky Flats, a major concern arises when considering the statement in paragraph 150 of the IAG which reads "Interim Remedial Actions/Interim Measures shall, to the greatest extent practicable, attain ARARs." "Greatest extent practicable" leaves a lot of room for interpretation. By proposing activities as "interim measures," is DOE attempting to avoid full ARAR compliance?

Response to Comment 75

DOE has no intention of cleaning up RFP using IM/IRAs to avoid full ARAR compliance. The IAG clearly spells out the activities and schedules for remediation of the Plant. Final

remediation of the site will achieve ARARs except were ARAR waivers are appropriate and approved by EPA. The IAG clause pertaining to IM/IRAs attaining ARARs to the greatest extent practicable is a simple recognition that the IM/IRA is not the final solution, and therefore, may not be capable of attaining ARARs by virtue of the scope of the IM/IRA relative to the magnitude of the site contamination. The "extent practicable" is viewed in the context of the proposed remedial system, i.e., a remedial system is proposed that fulfills the objectives of the IM/IRA with a goal of attaining ARARs. If ARARs are not attained, DOE and the regulatory agencies will determine if IM/IRA design changes are necessary by considering the overall level of protectiveness provided by the IM/IRA, and whether the IM/IRA could be exacerbating the spread of contamination. It is fully expected that the proposed Subsurface IM/IRA will attain ARARs.

Comment 76

According to the Executive Summary of this document, page EX-1, "This IM/IRAP/EA identifies and evaluates interim remedial actions for removal of residual free-phase VOC contamination from three different subsurface environments at OU2. This document also considers interim remedial action for the removal of radionuclides from beneath the 903 Pad." What one discovers in reviewing the document, however, is that only the VOC removal technology is addressed in detail. The application of the radionuclide removal technology depends on further research and thus, very little information is presented.

Response to Comment 76

Please see Response to Comment 5.

Comment 77

Because this document only describes the in situ vacuum-enhanced vapor extraction technology, it is the Cleanup Commission's expectation that future application of technologies, such as steam stripping, also will be explained in detail similar to that found in this document, and that the public will have an opportunity to review and comment.

The Cleanup Commission is concerned, then, that DOE intends to implement additional technologies without proper review and comment. If DOE had intended this Subsurface IM/IRA document to be a "catch all" for any future technology introductions, it must reconsider. Each new technology must be presented in the same manner as vapor extraction is presented in this document. DOE certainly must realize the public's concern about mobilization of radionuclides from the OU2 area, given the past problems with the site, and must take every opportunity to address that concern.

Response to Comment 77

DOE does not intend this document to be a "catch all" for any future technology introductions. Technology development and testing will be performed as part of the site-wide and OU-specific treatability study programs. Steam stripping is considered in this IM/IRA because it appears applicable to both radionuclide and VOC recovery. Please see Response to Comment 5 regarding public access to steam stripping details.

Comment 78

> *In the discussion of steam stripping on page 4-5, mention is made that temperature increases as well as changes in pH may be effective in mobilizing radionuclides. In the descriptions of the vapor extraction processes, the use of a liquid propane gas-fired heater is proposed to inject hot air into the subsurface. It is thought that heat will increase the rate of volatilization of residual VOCs. Since heat in the form of steam may mobilize radionuclides, what is the potential for their mobilization with heated air?*

Response to Comment 78

The heated air injection that has been proposed as part of the Subsurface IM/IRA will not affect desorption of radionuclides from the soil matrices. Investigation of *in situ* dynamic steam stripping as a mixed waste remediation technology is based on a combination of chemical solubilization (e.g., pH adjustment, complexation) and heating to relatively high temperatures. Although chemical solubilization would be the primary mechanism for radionuclide recovery, the LLNL research will examine any effects contributed by the presence of steam heating.

Comment 79

> *Heat also may raise the subsurface soil temperature enough to sterilize the soil and destroy the natural bacteria contained therein. Has this possibility been examined and what efforts are planned to mitigate the loss of natural soil fauna?*

Response to Comment 79

Heat transfer to the soils is not thoroughly characterized at this time to allow prediction of the temperature profile that would develop. Therefore, it is not known whether the temperature increase would have deleterious or possibly growth stimulation effects on the soil microbial population. However, most of the microbial activity in soils occurs in the upper 3 feet of the soil, i.e., where developed soil horizons exist. This soil zone is not expected to be influenced significantly by the introduction of heated air.

Comment 80

Several references in the document are made concerning post-remedial site controls (page 4-9), construction specifications (page 4-12), and revegetation with native grasses and shrub species (page 4-13), but little detail is available. Page 5-3 states that well abandonment will be addressed in Section 4 of the Test Plan. Will other environmental restoration activities besides well abandonment also be described in detail in the Test Plan? If not, where will adequate descriptions of these programs be found?

Response to Comment 80

The IM/IRA describes a procedure (i.e., *in situ* vapor extraction) that is in a developmental phase. The areal influence and exact number of extraction/monitor wells has not been defined yet. Therefore, it is premature to provide more detail to environmental restoration plans than already exists in the document. Greater detail will be provided in the test plans to be provided later in the project.

Comment 81

On page 4-46, the section about CERCLA evaluation criteria discusses assessment of the proposed remedial action with respect to public acceptance. This section should be modified to include an item that addresses the public's concern with radionuclide mobilization and release from the OU2 area. Public acceptance of any action in OU2, especially the 903 Pad, will not be easily attained unless mobilization and dispersion of radionuclides is specifically addressed.

Response to Comment 81

One of the primary reasons *in situ* vacuum-enhanced vapor extraction was selected for the IM/IRA at OU2 was because it afforded a low probability of spreading subsurface VOC and radionuclide contamination. The risk of spreading VOC contamination is minimized because the area of influence is under negative pressure and the entire air sweep induced by the vacuum is collected at the extraction wells. Vapor extraction systems that include air injection present a somewhat higher chance of spreading VOC contamination. This risk is minimized, however, by proper design and operation of the injection and extraction systems to ensure closed subsurface "flow lines." In other words, all of the air injected eventually flows to an extraction well where it is recovered. The risk of spreading subsurface radionuclide contamination is also low with vapor extraction technology because radionuclides are non-volatile, even at the temperatures associated with heated air injection (less than 100°F). As discussed in Section 4.3, however, radionuclide-contaminated particulates may be collected at the extraction wells. The probability of this occurrence is highest during system startup because of the disturbed soils surrounding the newly constructed extraction wells. The conceptual design of the vapor treatment system presented in the Subsurface IM/IRAP/EA (Figure 4-6) includes HEPA filtration to prevent any radionuclide-contaminated particulates entering the extraction wells to be released at the exhaust stack.

Section 4.3.3.2 of the Subsurface IM/IRAP/EA will be modified to include an assessment of the expected public acceptance of the proposed actions with respect to uncontrolled subsurface mobilization and release of VOCs and radionuclides.

Comment 82

In light of that concern, more detail should have been provided in this document as to the precautions that will be taken to avoid radioactive contamination. Page 4-12 states, "During drilling and vapor extraction system installation, surveys would be performed to detect any radioactive contamination. Significant radioactive contamination would be handled in accordance with PSHSP." Page 4-19 also alludes to the PSHSP (Project Specific Health and Safety Plan) stating that "the PSHSP will also specify appropriate air monitoring and response procedures in the event of an unusual VOC or radionuclide release." These procedures are important public concerns and should be made available for review in this document, not relegated to some other document that is not widely distributed or available for public comment.

Response to Comment 82

The health and safety procedures presented in the PSHSP will be specific to Subsurface IM/IRA construction and operating activities. Therefore, the PSHSPs will be completed after the IM/IRA design is finalized, at which time it will be made available to the public and discussed in DOE Quarterly meetings.

Comment 83

Another item that could be added to the list of public acceptance criteria is the positive view of in situ soil remediation technologies. These technologies, should they prove effective, are much more favorable than an ecologically damaging and expensive program of soil removal and storage as waste.

Response to Comment 83

Sections 4.3 through 4.5 will be modified to discuss the expected public acceptance of the proposed Subsurface IM/IRA with respect to its *in situ* nature. In extolling the benefit of *in situ* remediation, however, it is important to not lose sight of the potential benefits afforded by non-*in situ* treatment of vapor extracted soils for any radionuclides and metals that may be present. In other words, mixed waste remediation of OU2 soils may involve a combination of *in situ* and non-*in situ* technologies.

Comment 84

As was mentioned earlier, too many important details about health and safety considerations are referenced as being part of other documents which will not be available for wide-spread public review and comment. Specifically, the Pilot Test Plan and the Pilot Test Report, which will contain most of the specific protection measures and other details, are mentioned as being available to the public for review, but not for comment. Because these documents will be technical in scope, they would be a good choice for review by the Technical Review Group. Such review should come at the same time when the Test Plan and Report are being reviewed by the regulatory agencies, thus guaranteeing the possibility of true public input.

Response to Comment 84

The Pilot Test Plan and Pilot Test Report will be made available to the public, and they will be submitted to the TRG for review and comment during the regulatory agency review. See Response to Comment 5.

Comment 85

As activities in environmental restoration begin to increase, the DOE should begin to consider a forum for the sharing of monitoring and other technical data generated during the ER process. Perhaps the monthly Exchange of Information Meetings could be used as such a forum, provided that the data can be usefully summarized. Questions could then be answered and information made available about the effectiveness of the different water treatment systems at the plant. As information becomes available from the Remedial Investigations, it too could become a topic for presentation at the Exchange of Information meetings.

Response to Comment 85

DOE is making every attempt to keep the public informed on environmental restoration activities at RFP. Your suggestion is a good one, and DOE will pursue presentation of concise reports of monitoring and technical data at the monthly Exchange of Information Meetings.

Comment 86

A section needs to be added to this IM/IRAP/EA that discusses how the results of this pilot study will be incorporated into a final remedy for OU2. In addition, how will the other technologies such as dehalogenation, chemical oxidation, and bioremediation be handled? Should these technologies prove effective in lab and bench-scale studies, will they too undergo implementation through an interim measure using the Observation/ Streamlined Approach? Will technologies that have undergone interim study have a

preferential advantage over other technologies in the final remedial action design and selection?

Response to Comment 86

There is a brief discussion of the evaluation criteria for the Subsurface IM/IRA on page 4-32 of the IRAP. As discussed in Section 5 of the IRAP, the Test Plans will contain a section (Section 3) that presents the data quality objectives for the pilot tests. This section will more fully develop the data evaluation criteria as they relate to a final design for *in situ* vapor extraction.

The conduct of the proposed pilot tests as an IM/IRA represents a somewhat unique circumstance. As discussed in Response to Comment 73, pursuit of these tests represents, in part, DOE's commitment to conduct an IM/IRA at OU2 that has greater technical and remedial merits than the Woman Creek Basin IM/IRA. Performing such tests is also consistent with EPA criteria for conduct of IM/IRAs. However, in the future, innovative technologies will likely be tested under the site-wide and OU-specific treatability study programs. Conduct of IM/IRAs will be reserved for contaminant migration abatement and/or risk reduction using proven technologies.

Treatability studies are conducted to either screen, select, or design a remedy. Screening treatability studies are typically bench scale and represent "proof of concept" testing. The selection and design treatability studies are typically pilot (field) tests. The Subsurface IM/IRA is largely a selection type treatability study, i.e., depending on the outcome, it will be determined whether vapor extraction (or steam stripping) are preferred technologies relative to other source control measures. Therefore, technologies that are field tested are not necessarily the preferred technologies for final remediation.

Comment 87

Page 4-10 and continuing to the top of page 4-11 states that "although not intended to capture radionuclides, the GAC units provide redundant filtration capacity to ensure that radionuclides are not discharged to the atmosphere." What is the ability of GAC units to capture radionuclides? Given that the majority of particles to escape the HEPA filters will be less than 0.3 microns in size, what is the efficiency of the GAC filters in capturing particles that small?

Response to Comment 87

Although vapor-phase GAC adsorption is not intended for removal of particulates, a degree of filtration capacity is inherent in the design of the units (i.e., granular packed bed). However, the GAC units would not be expected to remove particulates smaller than 20 to 50 microns in size. Thus, with properly operating upstream HEPA filtration, the GAC units will not provide additional system filtration capacity. In the unlikely instance where the HEPA filters are not properly functioning; however, the GAC units would provide some degree of filtration as noted

above. The text on page 4-11 of the Subsurface IM/IRAP/EA will be modified to clarify this point.

Comment 88

Page 4-22: In Section 4.2.3.11, Cumulative Impacts, the last sentence states, "impacts resulting from installation activities or operational accidents would be short-lived and are, thus, also not cumulative." Earlier in the paragraph the definition of cumulative impacts, as described in 40 CFR 1508.7, is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Given the above definition, it would seem that actions described in this interim measure would have some contribution to the total emissions from the plant, even if minor. As we did in our comments for the Plan for Prevention of Contaminant Dispersion, the Cleanup Commission stresses that some form of accounting system needs to be maintained at Rocky Flats in order to address all releases from the plant. Certainly the vapor extraction and installation will not be the only activities ongoing at the plant. All emissions records must be accumulated on a regular basis so that total emissions from the plant can be accounted for.

Response to Comment 88

Periodic monitoring of any existing emissions from the IM/IRA has been planned for and will be done throughout the course of the project. Detailed records of all operating parameters will be maintained. Therefore, the contributions of the IM/IRA to the cumulative impacts of the RFP will be known and accounted for.

Comment 89

Page 4-23: One of the three criteria for test site selection is that there be a low probability of the site containing buried drums. Specific information is not available for each site, however, that will guarantee that drums are not present. What is the contingency in case a drum is encountered during the drilling of any of the wells?

Response to Comment 89

Geophysical surveys have been conducted at all the sites. These surveys provide information on the presence of buried material, including drums. For example, Figure 2-2 of the IRAP indicates the locations of buried drums based on a magnetometer survey. The Health and Safety

Plan for the IM/IRA will specify the contingency measures to be taken if drums are encountered. The presence of drums will be cause to choose an alternate site for the conduct of the pilot tests.

Comment 90

Page 4-28: In the section discussing the fact that ambient and heated air will be injected at one-half the combined extraction rate, it would be advisable to make sure that each extraction pump is set at a rate just above the one-half figure, in case one of the extraction pumps should become inoperative. If air was pumped in at a greater rate than it was being extracted, contaminants could spread beyond the recovery zone.

Response to Comment 90

We agree. Your suggestion will be considered in the test plan development.

Comment 91

Page 4-33: The preliminary threshold for determining success of the operation at the 903 Pad will be hydrocarbon concentrations in the recovered soil vapor equal to 1 part per million. On pages 4-56 and 4-65, for the operations at the Mound and East Trenches sites, respectively, the threshold is listed at a hydrocarbon recovery rate of 0.5 pounds per day of VOCs. Why the difference?

Response to Comment 91

The threshold for success of 0.5 lbs/hr is an error. The correct threshold for success is 1 ppm as measured with a Photoionization Detector. The document will be corrected.

Comment 92

Page 4-34, Figure 4-6: In the legend for the diagram, the letters "SA" represent an analytical sampling location, but in the diagram itself the letters "AS" are found. Are they the same? In order to generate greater confidence in the system's operation, an additional analytical transmitter should be added to the end of the system to provide additional real-time monitoring of the actual vapors that will be released to the atmosphere.

Response to Comment 92

An "Analytical Sampling Location" is designated "AS" on Figure 4-6. The "SA" designation appearing in the legend is a typographic error and will be corrected in the final Subsurface IM/IRAP/EA to read "AS".

The conceptual design presented in Figure 4-6 includes an analytical sampling location (i.e., grab sampling) on the exhaust stack. From a pilot study perspective, grab sampling and offline analysis of exhaust gas is more desirable than "gross" online hydrocarbon sensing for reasons of detection limits and VOC speciation. Initial breakthrough of VOCs, for example, will be at relatively low VOC concentrations. The lower analytical detection limits afforded by offline analysis are necessary. Also the contaminants which breakthrough must be identified; this is a second shortcoming of online sensors. It is important to emphasize that the vapor extraction and treatment system design presented in the Subsurface IM/IRAP/EA is conceptual in nature. Details of the pilot process configuration and associated monitoring instrumentation will be determined during the design phase of the project.

Comment 93

> *Page 4-38: In describing the alarms that will be attached to the real-time monitors, mention is made that the signals from the monitors "may" be used to provide automatic shutdown of the system. Page 4-10 states the "HEPA filters will be followed by a radiation sensor that "will" shut down the system before the release of significant amounts of radionuclides to the GAC units can occur. Has a definitive decision been made as to the use of automatic shutdown devices? The Cleanup Commission encourages the DOE to provide such a shutdown mechanism given the uncertainties of conducting these operations without detailed site-specific information.*

Response to Comment 93

As discussed in Response to Comment 92, detailed specification and performance of the instrumentation and control systems will be completed during the design phase of the project. It is important to note that the design of the instrumentation and control system is intimately related to the process design in that each process configuration may have different control requirements. The pilot unit design effort will involve a thorough evaluation of the advantages and disadvantages of various vapor treatment process configurations along with their associated monitoring and control requirements. Protection of workers, the public, and the environment will be of primary concern in developing the pilot process and instrumentation/control (including automatic overrides) system designs.

Comment 94

Page 4-44: In the middle paragraph, the statement is made that HEPA filtration may be removed from the system if, after several weeks of operation, analysis of spent filtration media establishes that radionuclide-contaminated particles are not present in the vapor stream. Even though real-time radiation monitoring will still be conducted, the DOE should reconsider and continue to maintain HEPA filtration at all times.

Response to Comment 94

The suggestion for continued use of the HEPA filtration units even after the pilot unit has established an operating record showing no recovery of radionuclide-contaminated particulates has merit. Their continued use offers a measure of insurance. The tradeoff, however, is a loss of wellhead vacuum pressure due to the pressure resistance offered by the filters. This loss of vacuum pressure may translate into less effective recovery of VOCs from the subsurface. The decision to remove the filters or replace them with HEPA units offering a lower pressure resistance (i.e., larger pore size) is, therefore, best handled under the Observational/Streamlined Approach. As always, protection of workers, the public, and the environment will be the primary factors in making such decisions.

Comment 95

Page 4-44: In the discussion in the last full paragraph, mention is made concerning the possibility of using thermal oxidation to immediately destroy VOCs extracted from the subsurface should the concentrations be high enough. If such a situation arises, the Cleanup Commission urges the DOE to explore the Vapor Phase Photocatalytic Oxidation technology being developed at the National Renewable Energy Laboratory.

Response to Comment 95

The suggestion to consider the feasibility of ultraviolet (UV) photolysis as "pretreatment" to enhance the effectiveness of a catalytic incinerator is an excellent one. UV light has been shown to be effective in the degradation of certain aqueous-phase VOCs such as TCE and PCE. Application of the technology for destruction of carbon tetrachloride and other less reactive chlorinated solvents (e.g., TCA) has resulted in limited success. Nonetheless, should the pilot study data indicate that GAC adsorption would be uneconomical to use in post-pilot operation, evaluation of the use of thermal oxidation will include consideration of UV "pretreatment."

Comment 96

Page 4-49: In the second paragraph under cumulative impacts, it is mentioned that two workers will be involved in the routine operation and maintenance of the vapor extraction system at the 903 Pad and that the same workers will be used at the Mound and East Trenches. The document never really specifies whether the operations at the three sites will be conducted concurrently or sequentially. If concurrent operations are planned, are

two workers sufficient to manage all three sites? If sequential operations are planned, what is the schedule for each site?

Response to Comment 96

The three *in situ* vacuum-enhanced vapor extraction pilot tests will be conducted sequentially. This will allow the knowledge gained in the first pilot study to be incorporated into the design and implementation of the second test, and so forth. The current schedule for conduct of the pilot tests is presented in Response to Comment 20.

Comment 97

Page 4-50: In the description of the IHSS 113, the document states that 1,405 drums containing primarily depleted uranium- and beryllium-contaminated lathe coolant were stored at the site, and that records did not indicate whether the drums leaked. Still, free-phase chlorinated hydrocarbons are found in the water and will be addressed in this remedial effort. If the drums did leak and caused the hydrocarbon contamination, what happened to the uranium and beryllium?

Response to Comment 97

Drums and contaminated soils were removed from the Mound Site in 1970. The soils were contaminated with uranium (and probably beryllium). Soil sampling conducted after this initial remediation indicated that residual radioactivity was likely surface contamination derived from the 903 Pad Site via wind dispersal.

COMMENTER: [redacted]

Comment 98

This is public comment concerning OU2 Surface Water Interim Measures, Interim Remedial Action South Walnut Creek Basin.

In the plan for surface water treatment of radioactive waste in surface waters, your plan states "chemical precipitation with microfiltration followed by granular activated carbon absorption."

Water contaminated with Plutonium, Uranium, Radium, Strontium, Nickel, etc., has a half-life of 10,000 to 80,000 years. When water comes in contact with these radionuclides, the water itself becomes radioactive. The water itself changes subatomically, and the water is deuterium or tritium or "heavy water." It is scientifically impossible to filter radioactive water that has changed subatomically. That would be like

trying to filter H^+ ions out of water—subatomically filter out H^+ ions from deuterium or tritium.

Then to discharge this radioactive water into South Walnut Creek which feeds into the Great Western Reservoir will cause a disaster.

The Great Western Reservoir will have radioactive water in it, and it empties into Standley lake which will pollute the lake as well with radioactive water.

This mistaken idea that microfiltration will remove radioactivity from the water is erroneus [sic] and will only hurt people.

People have died from leukemia and cancer from drinking radioactive water in the past.

Finally, it my opinion that it will only cause harm and is a waste of time to try to "microfilter" radioactive water which is deuterium or tritium. The water molecules themselves change subatomically, and it would be like trying to filter H^+ ion subatomically out of a water molecule, according to physics it's impossible.

Response to Comment 98

Comment 98, pertaining to the South Walnut Creek Surface Water IM/IRA, was received after the Responsiveness Summary for that project was finalized. DOE's response to this comment is, therefore, presented in this Subsurface IM/IRAP Responsiveness Summary.

Highly controlled nuclear reactions involving relatively high "concentrations" of nuclear particles (i.e., flux) are necessary to produce radioactive species. For example, tritium is produced by bombardment of lithium with low-energy neutrons. Such highly controlled, high flux conditions are not present in the surface water that is collected at OU2. Thus, there is no risk of increasing the natural background concentrations of deuterium and tritium in surface water by the chemical precipitation/microfiltration and GAC adsorption treatment system.

The commenter is correct in noting that the Surface Water IM/IRA treatment system is not designed to remove deuterium and tritium that are present in the surface water (Note: deuterium occurs in nature at a ratio of 1 part per 6,500 parts normal hydrogen. Tritium occurs in nature at much lower levels). Instead, the treatment system is designed to remove radionuclides which are adsorbed to particulates (i.e., plutonium, americium, strontium, etc.). Such removals are accomplished by coagulation, flocculation, and microfiltration operations which are described in detail in the final South Walnut Creek Basin IM/IRAP/EA dated 8 March 1991.

SECTION 3

REMAINING CONCERNS

The issues raised during this public comment period pertaining to the proposed Subsurface IM/IRA for OU2 have been addressed in this Responsiveness Summary. Differences currently exist between CDH and DOE with respect to selecting ARARs that would apply to the treatment of RFP ground water. However, such differences do not present an obstacle for approval and implementation of the proposed Subsurface IM/IRA because any contaminated ground water that may be generated during conduct of the action will be treated by existing RFP facilities. Effluent limitations currently in place for these facilities will, therefore, apply to treatment of any recovered ground water.

Establishing a consistent approach for selection and application of ARARs for the RFP is of major concern to DOE. As discussed in Section 2 of this Responsiveness Summary (Response to Comment 14), DOE is currently preparing a consolidated approach to establishing ARARs that which will be presented to the regulatory agencies in the near future. Agreement between DOE and the regulatory agencies on a consistent approach is expected by early 1993.